HAMERSLEY IRON

A member of the Rio Tinto Group

Dampier Port Increase in Throughput to 145 Mtpa

ENVIRONMENTAL PROTECTION STATEMENT

- Rev 5
- September 2007

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Executive Summary

Introduction

Hamersley Iron Pty Limited (Hamersley Iron) is one of the world's largest exporters of iron ore. The company operates six iron ore mine sites in the Pilbara region of Western Australia, together with a dedicated railway and port facility in Dampier. The Dampier Operations include rail and port facilities, rail maintenance workshops, a 120 MW power station, laboratories and other service and administrative functions. The port, which is one of Australia's largest tonnage ports, includes two terminals – Parker Point and East Intercourse Island. The facilities are managed by Pilbara Iron (a member of the Rio Tinto Group) on behalf of Hamersley Iron.

With the recent rise in global demand for iron ore expected to continue, Hamersley Iron has an opportunity to consolidate its position in the world market. To meet the expected increase in demand for iron ore, Hamersley Iron is requesting environmental approval to increase throughput at its port facilities at Dampier from 120 Mtpa to 145 Mtpa. No construction, beyond that already approved, is required. The increase in throughput capacity will occur once all construction and commissioning work associated with the current replacement of existing infrastructure is completed, and will be staged in line with expected customer demand and mine developments.

This document describes the proposal and assesses the potential environmental effects of increased throughput at the port and describes the management strategies that will be adopted by Hamersley Iron to manage and minimise those impacts.

The Proposal

This proposal is to increase throughput at the Dampier Port to 145 Mtpa from Quarter Four 2007, and will be staged to achieve the new throughput in line with expected customer demand and mine developments in 2007 and 2008. Operation of the new Parker Point circuit constructed as part of the 95 Mtpa upgrade (completed January 2006) in conjunction with the replacement infrastructure currently being commissioned at Parker Point, will deliver a sustainable rate of approximately 100 Mtpa. Combined with the existing East Intercourse Island circuit, this will provide a total capacity of 145 Mtpa for Hamersley Iron's Dampier Operations.

Benefits of the Project

The increased throughput at Parker Point will provide benefits to the State and Nation including:

- An increased contribution towards the Nation's annual income through export sale of iron ore;
- Increased revenue to the State and Federal Government from taxes, levies and royalties from the production of iron ore and from taxation income from the Hamersley Iron profits; and

- Direct creation of additional employment opportunities though the provision of services and supplies to Hamersley Iron such as contracts for ongoing maintenance and repairs.

Community Consultation

Hamersley Iron initiated public consultation focussed on the Dampier Port Upgrade Project in 2003 and has continued to engage stakeholders and interested parties through the recent expansion projects. Through the continual engagement process, relationships with the community have provided ongoing access for dialogue.

Both formal and informal mechanisms, including structured committees, open days, information displays, site tours and newsletters have been used as part of the ongoing consultation program. Stakeholders consulted have included State and Local Government agencies, local community groups, Dampier Port Authority, Hamersley Iron workforce and others.

Key presentations on the 145 Mtpa proposal have been made to the:

- Shire of Roebourne/Department of Environment and Conservation. This group meets quarterly to discuss the progress of construction of the Dampier Port Upgrade and other related issues.
- Coastal Community Environmental Forum (CCEF). The committee meets six monthly and is made up of members from the Shire of Roebourne, various government agencies, the Dampier Port Authority, Pilbara Iron, Dampier Salt, Dampier Community Association and some others by invitation.
- Dampier/Karratha Community Advisory Group. This group provides a forum for interaction between Hamersley Iron and members of the Dampier and Karratha community.
- Burrup Industries. These included the DPA, Woodside Energy and Burrup Fertilisers.

Hamersley Iron will continue to have regular meetings of the Shire of Roebourne/Department of Environment and Conservation, Coastal Community Environment Forum and the Dampier/Karratha Community Advisory Group to keep the community abreast of current developments. The meetings also provide a forum for the community to seek information about the current proposal and raise potential concerns they may have as the increase in capacity is implemented.

Details of the consultation process, issues discussed and responses from Hamersley Iron are provided in this document. Major issues raised included:

- Dust;
- Noise;

- Marine impacts through sedimentation and shipping; and
- Water use and management on site.

Environmental Impacts and Management

Dust and Particulates

The operations at both Parker Point and East Intercourse Island generate dust that has the potential, in combination with naturally occurring background levels, to impact on the local environment and cause community concerns within Dampier.

A numerical model that defines dust plume dispersion as a function of meteorological conditions has been developed for the current 145 Mtpa approval process. The model, based on the CALPUFF model, was used to predict the impact of the proposed increased throughput to 145 Mtpa on dust levels within Dampier.

The increase in throughput to 145 Mtpa is predicted to result in an annual average emission rate for total suspended particulate of 196 g/s, compared to 160 g/s for 95 Mtpa throughput under similar meteorological conditions and operating scenarios. A significant portion of these emissions is due to the bulking activities, and stacker and reclaimer operations at Parker Point. As the contribution of these emissions to dust levels within the town of Dampier is dependent on appropriate prevailing winds, it doesn't automatically follow that increased dust emissions will lead to a proportional increase in ambient levels in Dampier.

Additional dust control measures will be implemented at both Parker Point and East Intercourse Island. Due to the prevailing wind direction and proximity, operations at East Intercourse Island have a proportionally more significant impact on dust levels in Dampier, than those at Parker Point. Consequently, the dust suppression measures are focussed at East Intercourse Island. These measures have resulted in a 20% reduction in dust generated from operations on the island.

The predicted changes to Dampier's dust levels from the increased throughput to 145 Mtpa are minor compared to the existing situation and most likely within the bounds of emissions estimation and modelling uncertainties. For the key criteria used to assess dust impacts – which for concentrations include contributions from background and other sources, the predictions for the proposed throughput at 145 Mtpa are as follows:

- The NEPM 6th highest 24-hour PM_{10} concentration goal of 50 $\mu g/m^3$ is predicted to be met at the DPS site although exceeded in the northern part of the Dampier township. This is similar to the current situation.

- Similarly, the Kwinana EPP residential 6th highest 24-hour TSP concentration of 90 μg/m^3 is predicted to be met at the DPS although exceeded in the northern part of the Dampier township. This is similar to the current situation.

- The predicted average dust deposition in the Dampier township for both 95 and 145 Mtpa is within NSW dust deposition criterion of 2 g/m^2/month with a 26% reduction being predicted for 145 Mtpa.

- The maximum monthly dust deposition for both 95 and 145 Mtpa exceeds the NSW dust deposition criterion in the northern-most part of the Dampier township, however it is slightly reduced for 145 Mtpa.

A significant increase in ambient dust levels is predicted to occur at King Bay for a 145 Mtpa throughput as there are fewer dust suppression measures proposed for Parker Point to specifically reduce impacts at King Bay. Despite the increase in ambient concentrations, the KEPP goal of 150 μg/m^3 is predicted to be satisfied at King Bay.

Noise

A noise model developed for the 95 Mpta and 120 Mpta expansions, was employed to predict the impact of the proposed increased throughput to 145 Mtpa on noise levels within the town of Dampier.

The maximum noise emission from the 145 Mtpa upgrade (with bulking and the power station included) is expected to be quieter than the 95 Mtpa by 0.2 dB.

The increase in throughput to 145 Mtpa will result in an increase in the number of trains per day at Parker Point from 9 for 120 Mtpa to 11 for a 145 Mtpa throughput. The estimated day time and night time LAeq noise levels from the train activities at the closest noise sensitive premises are well below those target noise levels outlined by the Western Australian Planning Commission Draft Statement of Planning Policy: Road and Rail Transport Noise and the EPA draft statement for environmental impact assessment (No.14, Version 3) entitled “Road and Rail Transportation Noise”.

Hamersley Iron is committed to continuing to reduce noise emissions and is implementing a Noise Management Plan and Noise Monitoring Program. A Noise Improvement Plan has been developed and is being implemented. A permanent noise monitor has been installed in conjunction with the 145 Mtpa upgrade on the north side of Dampier to monitor noise emission from the Parker Point facility, with an additional permanent noise monitor planned to be installed on the south-western side of Dampier during 2007.

Water Supply

Water for the existing operations is purchased from the Water Corporation and sourced from the Harding Dam and the Millstream Aquifer. It was estimated that increasing throughput to 120 Mtpa will result in total water consumption of 2.16 GL pa. Increasing throughput to 145 Mtpa will require a further 360 ML pa, with total water use expected to be 2.52 GL pa. The existing Dampier town and rail water demand will remain around 750 ML pa. The majority of the water will be used for dust suppression. Whilst water consumption will increase, the water use efficiency will improve per L/t shipped compared to the current situation.

Hamersley Iron is committed to reducing the consumption of water wherever possible. The Excellence in Water Management diagnostic programme commenced in June 2004 to identify opportunities to reduce freshwater consumption and improve water efficiency. A number of projects are planned to reduce water consumption.

Greenhouse Gas Generation

Annual greenhouse emissions from the Port Operations at a throughput of 145 Mtpa are estimated to increase from 82,602 t CO_2 –e (2005) to around 129,251 t CO_2 –e. The emissions per tonne of ore are expected to decrease from 1.00 kg CO_2 –e/tonne received to approximately 0.89 kg CO_2 –e/tonne.

The amount of greenhouse gas emissions produced from the existing operations is calculated monthly based upon energy and fuel consumption. These data are used to track progress against emission targets on a monthly basis. The activities associated with the port upgrade will be included in the emissions estimates and annual report to the Greenhouse Challenge Office.

However, whilst the increased tonnage being processed through the port will require additional power to be supplied from the existing gas fired power station, the greenhouse gas emissions from the power station will remain the same. No additional power will be generated by the power station, rather there will be a reallocation of power from existing users, with the overall greenhouse gas production remaining unchanged.

In accordance with EPA Guidance Statement 12 (EPA, 2002) Hamersley Iron has developed a Greenhouse Gas Management Plan for the project.

Marine Environment

Potential impacts on the marine environment from the increased throughput include the increased potential for introduction of marine pest species transported within the ballast water or on ship hulls and the increase risk of oil spills from collisions.

Dredging associated with the 145 Mtpa capacity upgrade has been referred separately to the EPA for approval via the Assessment on Referral Information (ARI). Therefore, dredging associated environmental and marine impacts have not been considered within this EPS.

While the impacts on the marine environment could potentially be significant on a localised scale, the risk of occurrence is low and Hamersley Iron will implement appropriate management strategies to ensure impacts are minimised.

Summary of Environmental Commitments

Hamersley Iron is committed to meeting a level of environmental management performance consistent with national and international standards and statutory obligations. The increased throughput will be managed in a manner that will minimise impacts on the surrounding biophysical and social environments. Hamersley Iron has already undertaken environment management strategies and commitments associated with the upgrade to 120 Mtpa which will be applicable to the increase in throughput to 145 Mtpa and which will be enforced under the applicable legislative requirements to ensure that they are implemented to the satisfaction of the decision-making authorities.

A summary of the environmental issues related to the increased throughput at the port and the management strategies proposed to minimise environmental impacts is given in **Table ES-1**.

Table ES-1 - Summary of Environmental Issues and Management

Environmental Factor	Management Objective	Existing Environment	Potential Impacts	Management Strategies	Predicted Outcome
Dust	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	In combination with ambient dust levels, the operations at both Parker Point and East Intercourse Island generate dust that has the potential to impact on the local environment and cause community concerns within Dampier. Hamersley Iron has developed and updated a Dust Management Plan to address this issue for the existing operations.	Potential for an increase in dust emissions within the town of Dampier and King Bay from the proposed increase in throughput.	Hamersley Iron has prepared and implemented a Dust Management Plan which includes a dust suppression improvement plan which is regularly reviewed Hamersley Iron will continue to identify and implement operational initiatives to reduce dust generation	The proposal to increase throughput to 145 Mtpa has a minor effect on the peak short-term concentrations, ie the 24-hour PM10 and TSP concentrations at the Dampier Primary School.
Noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards.	A study of the existing noise levels within the town of Dampier found that the average noise levels are above the assigned noise criteria.	The proposed increased throughput will have the potential to add to the existing noise levels. Modelling shows that the increase in throughput is expected to be quieter than the 120 Mtpa case, and similar to the 95 Mtpa plant.	Hamersley Iron has prepared and implemented an Environmental Noise Management Plan and Noise Monitoring Program. The aim is to reduce noise emission from the Port facilities by applying noise control measures to existing noisy equipment and by purchasing quieter equipment in the future where it is practicable to do so, maintaining existing noise control treatments and reducing rail noise.	The maximum noise emission from the 145 Mtpa upgrade (with bulking and the power station included) is expected to be quieter than the 95 Mtpa by 0.2 dB.

Environmental Factor	Management Objective	Existing Environment	Potential Impacts	Management Strategies	Predicted Outcome
Water Supply	Minimise the impact on natural water resources by minimising water consumption.	Water for the existing operations is purchased from the Water Corporation. Estimated water usage at a throughput of 120 Mtpa is 2,160 ML pa	Additional water will be required for dust suppression.	Water usage will be minimised where possible. Water cannons on stockpiles will be automatically controlled by weather conditions. Opportunities for water recycling and reuse are being investigated.	An additional 360 MLpa of water will be required, bringing the total to 2.52 GLpa.
Greenhouse Gas Emissions	To minimise emissions to levels as low as practicable on an ongoing basis and consider offsets to further reduce cumulative emissions.	In 2005 Dampier operations emitted 82,602 tonnes of CO_2-e per year. The emissions from the operations are estimated at 1 kg CO_2-e per tonne of ore shipped. Rio Tinto is a signatory to the Greenhouse Challenge and as such collates and reports greenhouse gas data in its annual reporting.	Following the increase to 145 Mtpa, the emissions are expected to increase to approximately 129,250 tonnes of CO_2-e per year. The emissions are expected to decrease slightly to 0.89 kg CO_2-e per tonne of ore shipped.	Hamersley Iron will continue to estimate and report on greenhouse gas emissions and develop abatement programs under the Greenhouse Challenge.	Greenhouse gas emissions for the Port operations will increase following the throughput increase. There will be a decrease in the total emissions for each tonne of ore shipped.
Shipping Movements	Maintain the integrity, ecological functions and environmental values of the seabed and nearshore areas.	The Parker Point Operations are located on the southern shores of King Bay. A number of modifications, including the construction of sea walls, wharfs and reclamation areas, have been made to the shore line in this area over the life of the current operations. No mangrove or mangrove habitats exist in the immediate Parker Point area, but mangrove habitat occurs to the east in King Bay.	An increase in shipping activity has the potential for impacts on the marine environment through the introduction of marine pest species transported within the ballast water or on ship hulls and the increase risk of oil spills from collisions.	Impacts on the marine environment from increased throughput will be minimised and managed through: ▪ Dampier Port - *Port of Dampier – Oil Spill Contingency Plan*. ▪ The Marine Management Plan prepared as a condition of the 95 Mtpa Upgrade.	Shipping movements will increase. Additional shipping using the wharf facility will have negligible impact on the marine water quality.

1. Introduction

1.1 Background

The iron ore handling port facilities at Dampier in the Pilbara region of Western Australia are owned by Hamersley Iron Pty Limited (Hamersley Iron) and operated by Pilbara Iron Pty Limited (Pilbara Iron) on behalf of Hamersley Iron. The Dampier port is one of Australia's largest tonnage ports.

There are two iron ore ship-loading terminals at Dampier; these are located at Parker Point and East Intercourse Island. Each port has facilities for train unloading, ore stockpiling and blending and ship loading. Ore is delivered to Dampier by a dedicated railway network that transports ore from the many inland iron ore mines operated by Pilbara Iron.

The Dampier Port Operations have undergone various upgrade works to increase its capacity. In 2003 environmental approval was granted to increase the capacity of the Dampier Port from 80 Mtpa to 95 Mtpa (Ministerial Statement 000638, dated 20 November 2003). Construction of that upgrade is complete. In 2005 environmental approval was granted to further increase the capacity of the Dampier Port to 120 Mtpa (Ministerial Statement 000702, dated 25 November 2005). The increase in throughput to 120 Mtpa will be achieved through greater utilisation of the original and new circuits at Parker Point (in addition to the existing operation at East Intercourse Island). In accordance with Section 45B of the *Environmental Protection Act,* the conditions and procedures of Ministerial Statement 702 for the 120 Mtpa supersede the conditions and procedures of Ministerial Statement No 638.

In addition to the above approvals granted under Part IV of the *Environmental Protection Act 1986*, additional approvals have been granted for several minor amendments to the 120 Mtpa proposal. These include: replacement of Car Dumper #1, Screenhouse #1 and Shiploader #1; a 100 m extension to the wharf, relocation of the seawall and extension of the existing eastern quarry. Following commissioning of these facilities a total throughput of 145 Mtpa is achievable.

1.2 The Proposal

This Environmental Protection Statement (EPS) is seeking approval under Section 38 of the *Environmental Protection Act 1986* to increase throughput at Parker Point from 75 Mtpa to 100 Mtpa (thereby increasing overall throughput at the Port of Dampier from 120 Mtpa to 145 Mtpa). No actual construction is associated with this current proposal.

1.2.1 Proposal Title

The title of the proposal is "Dampier Port Increase in Throughput to 145 Mtpa".

1.3 The Proponent

The proponent for this proposal is:

Hamersley Iron Pty Limited
Level 22, Central Park
152-158 St George's Terrace
PERTH WA 6837

Hamersley Iron is the asset owner and a subsidiary of the international mining group Rio Tinto and forms part of the major business unit of Rio Tinto Iron Ore. The Dampier Operations are managed on behalf of Hamersley Iron by Pilbara Iron.

Pilbara Iron is a member of the Rio Tinto Group, and is a world-class asset manager that operates and maintains mining, rail and export facilities in the north-west of Western Australia on behalf of asset owners, Hamersley Iron (100% Rio Tinto) and Robe River Iron (53% Rio Tinto) Associates.

Established in 2004, Pilbara Iron facilitates closer co-operation between Hamersley Iron and Robe - two independent Rio Tinto Group iron ore operations with long histories of successful mining in the Pilbara.

Hamersley Iron and Robe remain independent following the establishment of Pilbara Iron and each company continues to separately market its products and retain accountability for strategic development of its mineral resources.

The aim of Pilbara Iron is to contribute cost benefits and realise operational efficiencies for both Hamersley Iron and Robe.

With a combined network of ten mines, three shipping terminals and the largest privately owned railway in the world, Pilbara Iron produces more than 143 million tonnes of iron ore annually and is growing towards 200 million tonnes.

The key contacts for this proposal are:

Mr Peter Royce
Senior Adviser Environmental Approvals
Hamersley Iron
Level 22, Central Park
152 – 158 St Georges Terrace
PERTH WA 6837

Ph: (08) 9327 2351
Fax: (08) 9366 5225
Email: peter.royce@riotinto.com

1.4 Licensing/Approvals

The Dampier Operations operate under the *Iron Ore (Hamersley Range) Agreement Act 1963* and are licensed as a prescribed premise under the *Environmental Protection Act 1986*. The Parker Point Operations operate under Licence number 4542/9 – File number L18/72. The East Intercourse Island Operations operate under Licence number 6951/10 – File number L144/97.

The Dampier Port Operations have recently undergone various upgrade works to increase its throughput capacity. Details of the various works, corresponding environmental approval process and dates of environmental approval are provided in **Table 1-1**.

- **Table 1-1 - Recent approvals for upgrade, capacity increase, replacement facilities and minor amendments granted under *Environmental Protection Act 1986.***

Scope of Approval	Approval Process	Approval Date
Increase capacity from 80 to 95 Mtpa through additional infrastructure at Parker Point	Formal assessment under Part IV of the *Environmental Protection Act* through Environmental Protection Statement	November 2003
Increase capacity from 95 to 120 Mtpa through increased utilisation of original infrastructure and new installed circuit at Parker Point	Formal assessment under Part IV of the *Environmental Protection Act* through Environmental Protection Statement	November 2005
Seaward extension of existing seawall to enable the Northern bulking stockpile to be constructed	Section 45 C Part IV of the *Environmental Protection Act*	August 2005
Replacement of the original Car Dumper and Screenhouse at Parker Point with newer facilities and decommissioning/removal of original circuit.	Section 45 C Part IV of the *Environmental Protection Act*	December 2005
Replacement Car Dumper, Screenhouse and Shiploader at Parker Point	Works Approval Part V of the *Environmental Protection Act*	December 2005
100 m Wharf extension at Parker Point	Section 45 C Part IV of the *Environmental Protection Act*	December 2004
Extend existing quarry for seawall construction	Section 45 C Part IV of the *Environmental Protection Act*	February 2006

1.5 Current Environmental Approval Process

Preliminary details of the proposal to increase throughput to 145 Mtpa were referred to the Environmental Protection Authority (EPA) in January 2006. The EPA determined that it may be appropriate to assess the proposal through the Environmental Protection Statement (EPS) process. The EPA advertised its intention to set an EPS assessment level for the process in the West Australian newspaper on Monday 20 February 2006 stating that:

- The level of assessment of the proposal has not yet been set by the EPA;
- That there are no appeal rights until the level of assessment has been set; and

- That anyone interested in the proposal should contact the proponent if they require information or wish to be part of the consultation process.

After notification of the intent to assess the proposal as an EPS, the EPS document is prepared by the proponent in consultation with government agencies, stakeholders and other interested parties. The EPS process requires considerable upfront investigation and community consultation. Once the report has been finalised and submitted to the EPA, the EPA confirms the level of assessment as an EPS is appropriate and the Minister for the Environment releases the EPA report and recommendations (Bulletin document) under Section 44 of the *Environmental Protection Act 1986*. The Bulletin document comprises draft Ministerial conditions and procedures that it considers should be applied to the proposal. The document is released for a two week period providing appeal rights to the general public.

The EPS level of assessment is considered appropriate by Hamersley Iron for this proposal, as the environmental impacts are not believed to be significant and can be readily managed to meet the EPA's environmental objectives. Furthermore, Hamersley Iron considers that the increase in throughput will be of interest to the local community (Dampier and Karratha) rather than Western Australia as a whole.

1.5.1 Ministerial Conditions (120 Mtpa)

The environmental approval to increase the throughput of the Dampier Port Operations to 120 Mtpa is subject to a number of conditions and procedures contained within Ministerial Statement (Statement 702). Schedule 1 of Ministerial Statement 702 covers the key proposal characteristics, while Schedule 2 of Ministerial Statement 702 provides the Proponent's commitments. The current status of the Ministerial Conditions is summarised in **Table 1-2.**

On 28 June 2006, Hamersley Iron submitted an application to the Chairman of the EPA under Section 46 of the Environmental Protection Act requesting an extension to the time frames for compliance associated with some conditions relating to the completion of an updated emissions inventory for dust sources (Condition 702:M7-3), undertaking a dust dispersion modelling of operations at 95Mtpa utilising the dust emissions inventory (Condition 702:M7-4), and a review of dust management performance and a subsequent report detailing the occurrences of exceedences (Condition 702:M7-5). The EPA recommended that Conditions 702:M7-3 and 702:M7-5(a) be amended to extend the time limit for completion of the updated emissions inventory and dust management performance review and report by six months, as sought by Hamersley Iron. It should be noted that although there is no time frame for condition 7-4, it is a pre-requisite to condition 7-5. Hamersley Iron is received Ministerial Statement 734 (dated 12 December 2006) which provided for deletion of Condition 702 M7-3 and 702 M7-5 and replaced them with Condition 734 M7-3 and 734 M7-5 which allowed for a the deferment of the dust emission inventory to the end March 2007 and the report to the end of June 2007.

Table 1-2 - Current status of Ministerial Conditions (702).

Condition	Requirement	Submitted	Status
M3	Proponent nomination and contact details	Not applicable	No changes to nominated proponent required
M4	Commencement and time limit of approval	Not applicable	Proposal substantially commenced
M5	Compliance audit and performance review	17/2/2006 and 18/4/2006	Draft Audit Tables submitted to Environmental Audit Section of DEC. Annual reporting on performance submitted by 31 March each year.
M6	Decommissioning Plan	Not yet required	Due 6 months before decommissioning. Preliminary Closure Statement cleared by Environmental Audit Section of DEC on 22/10/2004
M7	**Dust management**		
M7-1	Implement Dust Management Plan	Ongoing	2005-06 Dust Management Plan being implemented
M7-2	Implement Dust Monitoring Program	Ongoing	Included in 2005-06 Dust Management Plan
M7-3	Revised Dust Emissions Inventory	Submitted 29 March 2007	Condition amended under Section 46. New Statement 734 defers to March 2007.
M7-4	Dust Dispersion Modelling of Operations at 95Mtpa	Not yet required	Condition amended under Section 46. New Statement 734 implies deferment to June 2007. Report to be issued before 30 June 2007.
M7-5	Submission of 95 Mtpa Dust Study Report	Not yet required	Condition amended under Section 46. New Statement 734 defers to June 2007. Report to be issued before 30 June 2007.
M7-6	Dust Dispersion Modelling of Operations at 120 Mtpa	Not yet required	Scheduled for 2007
M7-7	Submission of 120 Mtpa Dust Study Report	Not yet required	Scheduled for before 30 December 2007
M7-8	Update Dust Management Plan	Not yet required	Scheduled for before 30 September 2007
M7-9	Implementation of updated Dust Management Plan	Not yet required	Scheduled for after 30 September 2007
M7-10	Provide copy of updated Dust Management Plan to CEO	Not yet required	Scheduled for after 30 September 2007 following approval of updated Dust Management Plan
M8	**Noise Management**		
M8-1	Implementation of Noise Management	Plan cleared	Implementation ongoing

Condition	Requirement	Submitted	Status
	Plan	17/1/2005	
M8-2	Implementation of the Noise Monitoring Program	Plan cleared 17/1/2005	Implementation ongoing
M8-3	Submission of 95 Mtpa Noise Monitoring Report	Submitted 22/09/2006 Follow up 15/05/2007	Required before 31 December 2006. Comments received from DEC 09/11/2006. Responses provided Awaiting clearance
M8-4	Acoustic modelling assessment	Submitted 22/09/2006 Follow up 15/05/2007	Required before 31 December 2006 Comments received from DEC 09/11/2006. Responses provided Awaiting clearance
M8-5	Further noise abatement measures, if required	Submitted 22/09/2006 Follow up 15/05/2007	Will depend on outcome of 702:M8.4 Comments received from DEC 09/11/2006. Responses provided Awaiting clearance
M8-6	Review Noise Management Plan	Submitted 27/12/2006	Required before 31/12/2006
M9	**Marine Flora and Fauna**		
M9-1	Marine Flora and Fauna – field survey	5/11/2004	Cleared by Environmental Audit Section of DEC on 9/1/2006
9-2	Historical assessment of coral loss	5/11/2004	Cleared by Environmental Audit Section of DEC on 9/1/2006
9-3	Marine Management Plan	10/2/2005	Plan considered 'satisfactory to date' by Environmental Audit Section of DEC 9/1/2006
9-4	Implement Marine Management Plan		Implementation ongoing
9-5	Design drainage to avoid stormwater runoff and other impacts on marine environment	9/8/2004	Cleared by Environmental Audit Section of DEC on 17/1/2005
9-6	Provide copy of Marine Management Plan to CEO	12/8/2005	Copy provided
M10	**Community Surveys**		
10-1	Conduct dust and noise survey of Dampier and Karratha residents	10/8/2006	Survey/report considered 'satisfactory to date' by Environmental Audit Section of DEC on 23/8/2006
10-2	Survey to be conducted by approved consultant	10/8/2006	Survey conducted by Patterson Market Research.

Condition	Requirement	Submitted	Status
			Survey/report considered 'satisfactory to date' by Environmental Audit Section of DEC on 23/8/2006
10-3	Design survey to enable comparison with 2001 survey	10/8/2006	Survey/report considered 'satisfactory to date' by Environmental Audit Section of DEC on 23/8/2006
10-4	Provide results of survey to CEO	10/8/2006	Survey/report considered 'satisfactory to date' by Environmental Audit Section of DEC on 23/8/2006
M11	**Consultation**		
11-1, 11-2, 11-3	Implement Stakeholder Consultation Strategy, convene consultative group (CCEF)	Ongoing	CCEF meetings held every six months. Recent meetings held: 24 February 2004, 12 August 2004, 8 February 2005, 28 September 2005, 22 March 2006, 11 October 2006. 21 March 2007 Next scheduled meeting 19 September 2007
M12	**Public Availability of Documentation**		
12.1, 12-2	Make listed documents publicly available	24/2/2006	Closure Statement, Dust Management Plan, Environmental Noise Management Plan, Environmental Noise Monitoring Program, Marine Management Plan advertised (22/2/2006) and distributed (6/2/2006) to local libraries. Placed on Pilbara Iron website. Environmental Audit Branch notified 24/2/2006
P1, P2	Water balance for port, implement water recycling and water minimisation initiatives	8/9/2005	Cleared by Environmental Audit Section of DEC on 23/2/2006

1.5.2 Other Approvals

Other than a change to the existing licence conditions, no other environmental approvals are required (subject to the environmental approval). There will be no land clearing associated with the proposed increase in throughput which is the subject of this proposal.

A proposal for a maintenance and capital dredging programme (3.44 million m^3 in total, with 3 million m^3 to be dumped at sea and 440,000 m^3 to report to land) was referred to the WA EPA on

17 March 2006. That proposal has been assessed separately to the current proposal to increase throughput to 145 Mtpa.

The EPA Report and Recommendations (EPA 2006) on the dredging programme was released by the Minister for the Environment on 7 August 2006. The EPA assessed the proposal at the level of Assessment on Referral Information (ARI), as was the EPA assessment on the previous dredging programme during 2003 (with dredging undertaken during 2004). Hamersley Iron appealed the draft conditions recommended by the EPA during the two week appeal period that ended on 21 August 2006. The Minister for the Environment decided on the appeal on 2 November 2006.

Ministerial Statement (731) was granted by the Minister for the Environment on 22 November 2006. Dredging commenced December 2006.

Separate applications for sea dumping permits for the maintenance dredging programme and for the capital dredging programme were submitted to the Commonwealth Department of the Environment and Heritage (DEH) in March 2006. Sea dumping permits for the capital and maintenance dredging programme were granted by the DEH on 9 October 2006.

1.6 Project Schedule

The proposed increase in throughput is scheduled to progressively occur following commissioning of previously approved replacement facilities at Parker Point, which includes the new car dumper, screen house, shiploader, plus other minor modifications and a range of environmental initiatives. Decommissioning and removal of the original facilities at Parker Point will occur during 2007 following the successful commissioning of the replacement facilities.

Approved construction activities which allow for increased throughput to be achieved are scheduled for completion by Q4 2007. Dampier Port is expected to commence increasing throughput capacity to 145 Mtpa from Q3 2007, but will not exceed 120 Mtpa until all approvals for 145 Mtpa are secured.

1.7 Structure of this Document

This EPS document aims to identify and assess the potential environmental effects of the proposal and to describe the management strategies that will be adopted by Hamersley Iron to minimise adverse environmental impacts.

This document provides the following information:

- Introduction to the proposed capacity expansion, overview of the environmental approval process and the purpose of the EPS (**Section 1**);

- Justification of the proposed capacity expansion, why it should proceed, evaluation of alternatives and the decision making process (**Section 2**);
- Detailed project description (**Section 3**);
- Stakeholder and community consultation undertaken regarding potential environmental issues (**Section 4**);
- Existing Environment (**Section 5**);
- Operational environmental impacts and proposed management strategies (**Section 6**);
- Summary of Proponent's environmental management commitments (**Section 7**);
- Technical supporting information (**Appendices**).

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2. Project Justification and Evaluation of Alternatives

2.1 Project Justification

Driven largely by the strength of the Chinese market, growth in the global iron ore market has continued to exceed expectations. This presents an opportunity for Hamersley Iron to consolidate its position as one of the world's leading iron ore suppliers. Furthermore, the increased throughput at the Dampier operations will ensure that Hamersley Iron maintains its market share and continues to be a local employer and export earner in the long term.

Recent construction activity and increased utilisation of existing facilities has increased throughput capacity of the Dampier port operations to 120 Mtpa. However, in order to consistently meet the forecast growth in iron ore demand, it is clear that a further increase in throughput capacity is required.

The proposed increase in port throughput will provide benefits to the State and Nation including:

- An increased contribution towards the Nation's annual income through export sale of iron ore;
- Increased revenue to the State and Federal Government from taxes, levies and royalties from the production of iron ore and from taxation income from the Hamersley Iron profits;
- Direct creation of additional direct and indirect employment (through the provision of services and supplies to Hamersley Iron such as contracts for ongoing maintenance and repairs); and
- Ongoing contribution to the local economy and community through employee expenditure and company subsidies and contributions.

2.2 Evaluation of Alternatives

2.2.1 Development Options beyond 120 Mtpa

Hamersley Iron has considered a number of development options to increase tonnage beyond 120 Mtpa and to handle new products through the Dampier Port. These development options included:

- An increase in utilisation of existing infrastructure at Parker Point operations;
- Installation of new stockpiling and port facilities at either an existing port or at a greenfield (new) site;
- Upgrade of the East Intercourse Island operation; and
- Further upgrade of the Parker Point operation.

Upgrade of the Parker Point operation which includes replacement of the original in-loading and out-loading circuit (car dumper, screenhouse and shiploader) with new facilities and decommissioning of the original circuit at Parker Point was selected for the following reasons:

- Parker Point has the capacity to accommodate future expansion beyond the current 120 Mtpa, whereas East Intercourse Island is constrained by land availability and access;
- Parker Point is also preferable to East Intercourse Island in that the prevailing wind direction is from East Intercourse Island to Dampier, and an expansion of East Intercourse Island would have a greater potential to increase dust levels (and potentially noise levels) within the town of Dampier;
- It is considered to have the lowest environmental impact. Under current circumstances, Parker Point is preferable to a greenfield site as it is already disturbed and an increase in throughput could readily be accommodated within the existing management practices for the site; and
- It offers the lowest capital and operating costs.

2.3 No Development Option

If Hamersley Iron is unable to increase throughput of its Dampier operations, a significant opportunity to increase its export earnings will be lost. Potentially, the increased market demand would be met by increased production elsewhere in Australia or overseas. In this case the economic benefits would be lost to the local area, Western Australia and Australia.

In addition, the expansion of existing mining operations and the development of new mines would be restricted or deferred if sufficient export capacity is not available through the ports in a timely manner.

3. Project Description

3.1 Location

3.1.1 Locality Details

The Dampier Operations are located on the shores of Mermaid Sound at Dampier Western Australia (**Figure 3.1**). The operations are situated within the Shire of Roebourne.

The Parker Point operations are sited to the north east of the town of Dampier, while East Intercourse Island lies to the west south west (**Figure 3.2**). The proposed increase in throughput will be met at the Parker Point operations only; however significant environmental initiatives (mainly dust and noise) are being implemented at East Intercourse Island.

3.1.2 Land Tenure

The proposal to increase throughput at the port will be contained within the special lease area which was established in the name of Hamersley Iron under the *Iron Ore (Hamersley Range) Agreement Act 1963* as amended. The special lease area is zoned as General Industry.

3.1.3 Surrounding Land Use

The town of Dampier lies to the south west of the Parker Point operations, with the nearest residence located approximately 1 km away (**Figure 3.1**). Approximately 1,500 people live in the town of Dampier, which was built by Hamersley Iron in the 1960s. Dampier is no longer a company-run town and is administered by the Shire of Roebourne.

The Dampier Salt operations (part of the Rio Tinto group) lie to the south of Parker Point and the Woodside North West Shelf Venture Operations lie to the north east on the Burrup Peninsula (**Figure 3.1**). There are a number of other industries planned as well as expansion to existing facilities for the King Bay-Hearson Cove Industrial Estate on the Burrup Peninsula. At the time of writing, only one project (the Burrup Fertilisers Ammonia Plant) was operational.

3.2 Existing Operations (120 Mtpa)

The Dampier Port has been in operation since 1966 and over this time has undergone a number of expansions (refer to **Section 1.1**).

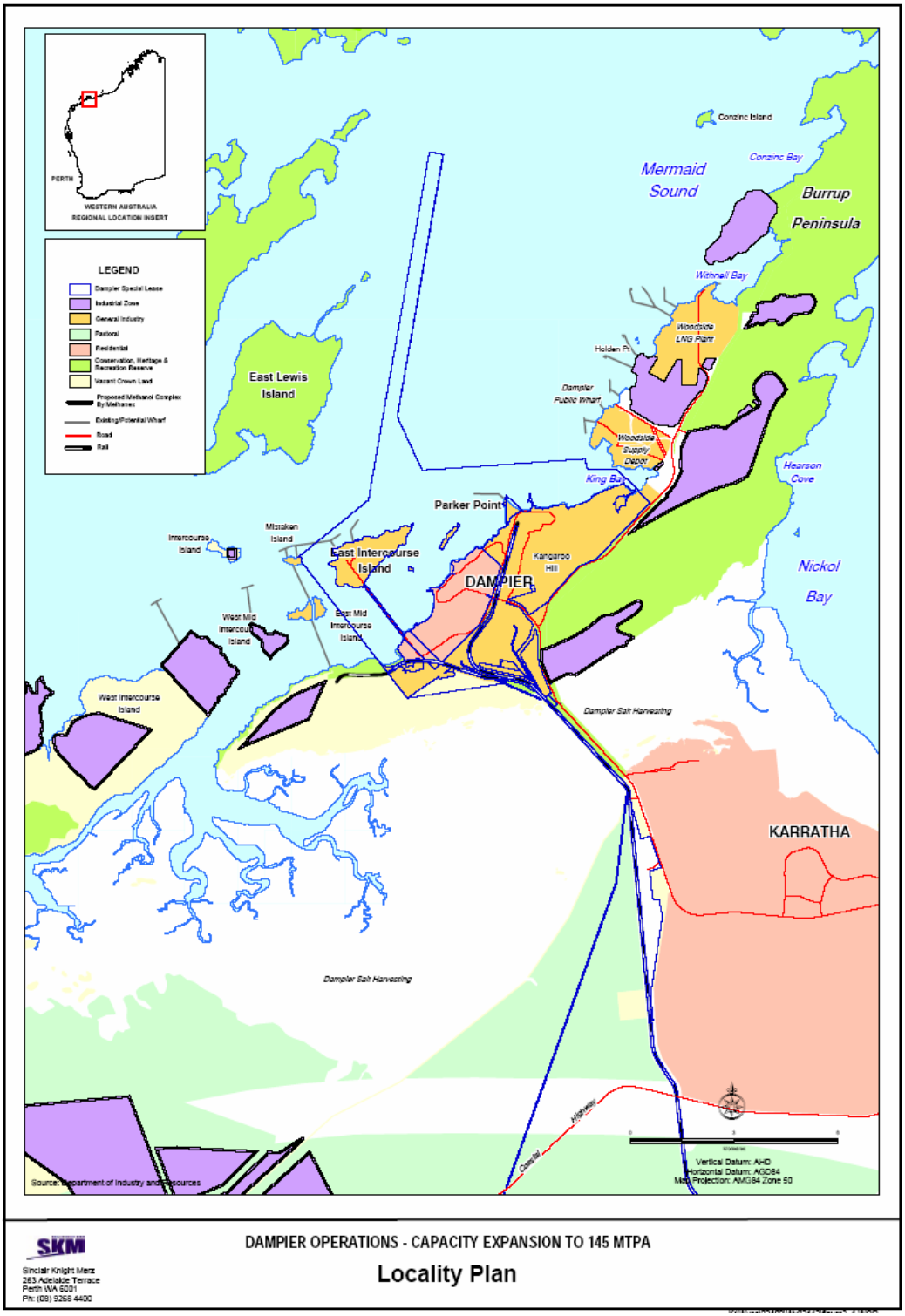
On arriving at the two terminals from the inland mines, ore is dumped from trains at rotary car dumpers, weighed and then moved to the ore stockpile areas by conveyors. At East Intercourse Island, conveyors take the ore 1.7 km across a causeway to the stockpile area.

Travelling and luffing stackers then blend the ore into stockpiles. Parker Point has twenty four (24) live-blending stockpiles while East Intercourse Island has 14 blending stockpiles. The ore is stored in these stockpiles until it is shipped.

Automatic bucket wheel reclaimers are used to reclaim the ore, which is then transported to the ship via a series of conveyors. At both terminals, lump ore is re-screened immediately prior to shipping. This process is precisely controlled and monitored to ensure that lump ore contains minimal fines. Undersize from this re-screening is conveyed back to the fines stockpiles.

Before any reclaimed ore goes to the shiploader, it is automatically sampled according to ISO standards using robotics and samples are analysed in a laboratory. Finally, the ore is loaded onto ships.

A process flowchart for the existing operations is shown in **Figure 3.3**.



- **Figure 3.1 - Dampier Port Operations – Locality Plan**

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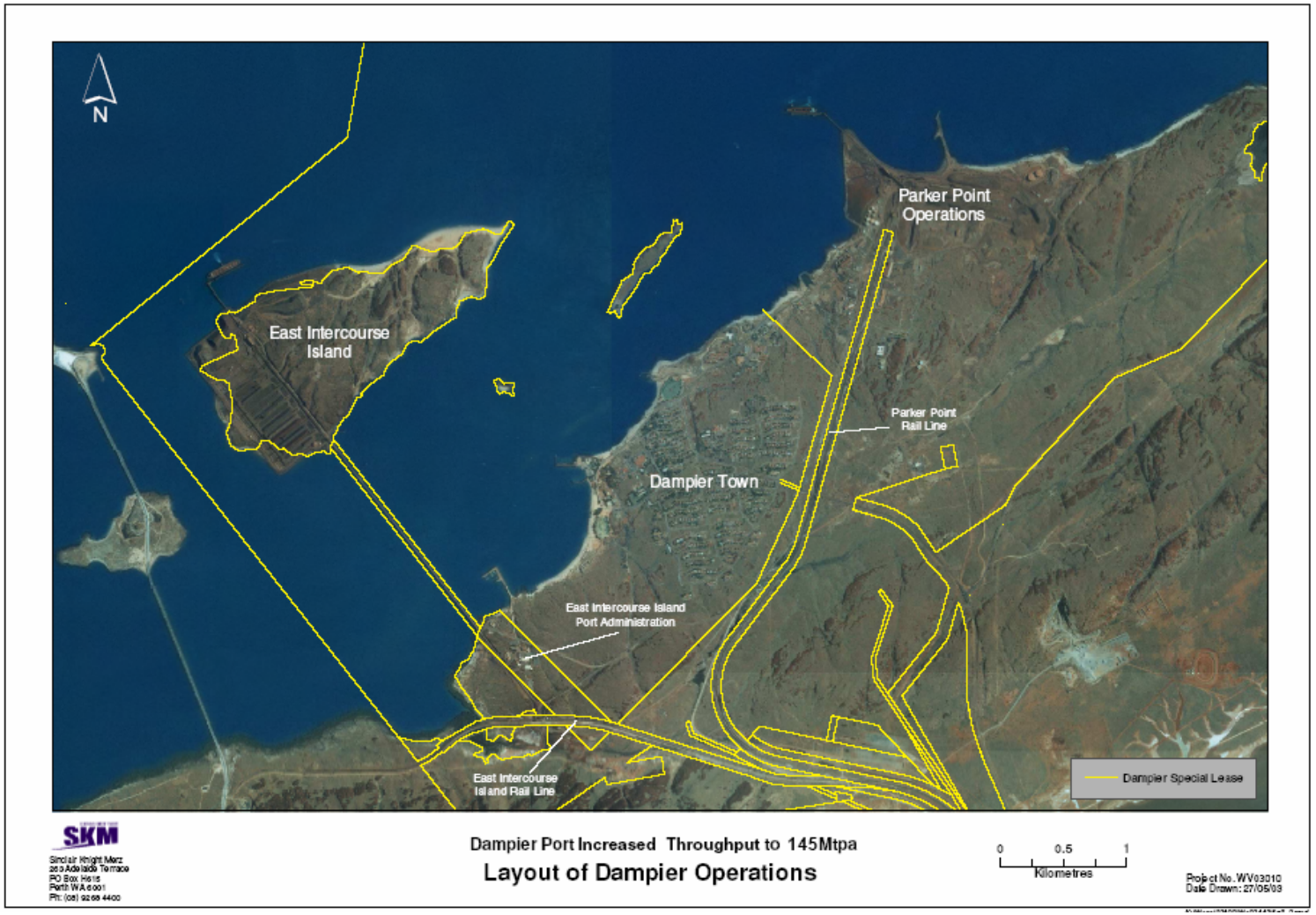

- **Figure 3.2 - Dampier Port Operations – Parker Point Layout Plan**

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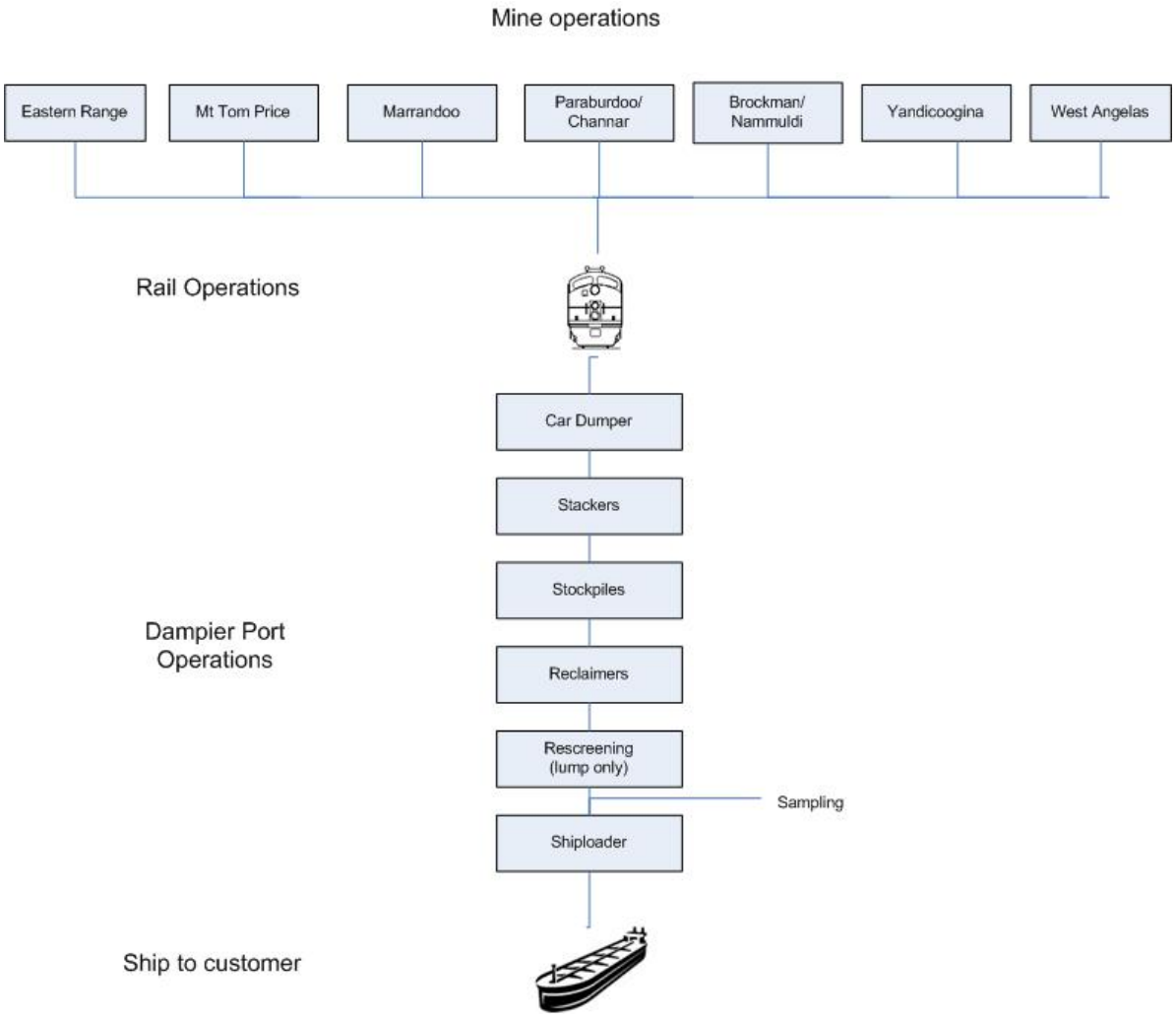

- **Figure 3.3 - Dampier Port Operations Process Flow Chart**

3.3 Current Construction Activities

Current scheduled construction (and de-construction or decommissioning) activities on-site include:

- Commissioning of replacement car dumper (CD4) and associated conveying to stockyard (ongoing);
- Shutting down and decommissioning of the original car dumper (CD1) (decommissioning ongoing);
- Rail works (sleepers, track, ballast) for CD4 on the existing formed railway embankment (completed);

- Replacement of the original 1,500 mm wide stockyard conveyors and transfers with 1,800 mm wide conveyors;
- Commissioning of replacement screen house (SH3P) and associated conveying ongoing;
- Shutting down and decommissioning of the original screen house (SH1P) (decommissioning ongoing);
- Commissioning of new and modified conveying to/from replacement screen house, including return fines conveying to all stackers (ongoing);
- Upgrade and extension of the existing wharf (almost complete);
- Replacement of the existing ship loading conveyors on the access jetty and wharf from 1,350 mm wide conveyors to 1,800 mm wide (almost complete);
- Commissioning of replacement ship loader (SL3P) (ongoing);
- Shutting down and decommissioning (removal) of original ship loader (SH1P) (decommissioning ongoing);
- Construction of artificial reef as environmental offset for extension of existing seawall (completed);
- Provision of a small (0.3 Mt capacity) additional bulking stockpile areas to the north east of the stockyard (completed); and
- Implementation of environmental initiatives, mainly relating to management of dust, water and noise (ongoing).

Construction activities are scheduled for completion by Q4 2007. With the commissioning of CD4 and decommissioning of CD1, it has meant that the 120 Mtpa is achieved through two different operating scenarios, namely:

- CD1 and CD3 operating; or
- CD4 and CD3 operating.

3.4 Proposed Port Capacity increase to 145 Mtpa

As a result of the replacement of the original plant infrastructure at Parker Point with a newer circuit, the throughput capacity at the port has the potential to increase to 145 Mtpa (100 Mtpa at Parker Point and 45 Mtpa at East Intercourse Island). No new capital works (beyond those already approved under *Environmental Protection Act 1986*) are required. The 145 Mtpa port capacity will be achieved by optimal utilization of existing facilities and those currently under construction once commissioned (**Figure 3.4**).

The key project characteristics of the proposed throughput to 145 Mtpa are provided in **Table 3-1**. Differences between the 120 Mtpa and 145 Mtpa scenarios have been bolded for easy reference.

Table 3-1 - Key Plant Characteristics – Parker Point

Characteristic	Existing Parker Point Operations (120 Mtpa)	Parker Point Operations following proposed increase in throughput (145 Mtpa)
Project Life	50 years	50 years
Parker Point Capacity	75 Mtpa	**100 Mtpa**
Nominal Parker Point Berth Capacity	220,000 DWT	220,000 DWT
Wharf Length	895 m	895 m
Number of shiploading berths	2 at 220,000 DWT and 1 at 180,000 DWT	2 at 220,000 DWT and **2** at 180,000 DWT
Blending stockpile capacity	4.7 Mtpa	4.7 Mtpa
Bulk stockpile capacity	2.5 Mtpa	**2.8 Mtpa**
Number of Products	7	**3**
Number of train arrivals	8 - 9 per day	**10 - 11 per day**
Rail dump cycle	100 seconds (average cycle)	80 seconds (average cycle)
Facility footprint	186 ha	186 ha
Major Plant Components	2 Car Dumpers 2 Lump Re-screening Plants 2 Sample Stations 4 Stackers 3 Reclaimers 2 Shiploaders 24 Stockpiles	2 Car Dumpers 2 Lump Re-screening Plants 2 Sample Stations 4 Stackers 3 Reclaimers 2 Shiploaders 24 Stockpiles
Plant Operation	24 hours, 7 days per week	24 hours, 7 days per week
Water Requirements	2,160 ML pa (PP and EII plus town and Rail)	**2,520 ML pa** (PP and EII plus town and Rail)
Shipping Movements	Approx 500-550 ships per year	**Approx 700 ships per year**
Workforce	Operations approx 440 personnel	**Operations approx 445 personnel**

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- **Figure 3.4 – Dampier Port Upgrade Phase A (95 Mtpa) and Phase B (120 and 145 Mtpa)**

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The implementation of the increased throughput does not alter the major plant components at Parker Point. The proposed increase in throughput will be achieved through the improved efficiency and flexibility, and increased capacity introduced into plant operations by the replacement car dumper, screen house and ship loader currently under construction/commissioning and the decommissioning of the older designed original facilities. The replacement facilities and upgrade to 1,800 mm wide conveying systems, will result in full product route flexibility that will allow any stockpile to be reclaimed via either screen house (SH2P or SH3P) to feed either ship loader (SL2P or SL3P). This level of product flexibility is fundamental to the stockyard management of a multiple product port.

3.5 Product System

Hamersley Iron is planning to shift to a simplified product offering in 2007, subject to conclusion of satisfactory commercial arrangements being negotiated. The simplified product offering includes Pilbara Blend lump and Pilbara Blend fines, which will be prepared by blending Brockman and Marra Mamba ore-types from the Pilbara Iron mines in the Pilbara. The overall strategy will be:

- Lump and fines, railed from Mt Tom Price, Paraburdoo (including Channar and Eastern Range), Marandoo, Brockman 2 and Nammuldi, Brockman 4, West Angelas (and Hope Downs 1) will be used to prepare Pilbara Blend products that will be shipped from Dampier;
- Pilbara Blend lump will be rescreened immediately prior to shiploading (lump ore is already screened under existing operations);
- Yandicoogina fines is to remain as a ‘stand-alone’ product and will be shipped from both Cape Lambert and Dampier; and
- Robe Valley products are ‘stand-alone’ and will be prepared and shipped from Cape Lambert.

The shift from existing HIP, HIX and West Angelas products to Pilbara Blend products is being made in response to market requirements and ensures long-term, stable, base-load supply capability that aligns the product offering with the resource base.

3.6 Ore Handling Facilities

In recent years the Dampier Operations have undergone a staged development of port facilities at Parker Point and East Intercourse Island to increase the export capacity, number of products and ship loading flexibility. The various phases and associated increase in capacity are shown in **Table 3-2**.

- **Table 3-2 - Recent upgrades and throughput increases at Dampier Port Operations**

Phase	Environmental Approval	Parker Point		East Intercourse Island		Combined Sites
		Mtpa	Products	Mtpa	Products	Mtpa
Prior to upgrade	Part V only	35	3	45	3	80
DPU Phase 95	20 November 2003	50	7	45	7	95
DPU Phase 120	25 November 2005	75	7	45	7	120
DPU Phase 145	Currently being sought	100	3	45	3	145

The replacement car dumper (CD4) provides an increase in the capacity of the ore car unloading rate compared with the original car dumper (CD1) which it replaces. This increased capacity can be achieved by a reduced unloading time for each train and a reduced time between trains.

The replacement car dumper (CD4) is a fully automated drive through dumper with equipment and installation identical to the existing and operating car dumper (CD3) installed as part of construction works to achieve 95 Mtpa. A new dumper out-feed conveyor will convey ore from the replacement car dumper (CD4) to the stockyard.

The replacement car dumper is housed within a facility building and equipped with a dry baghouse dust extraction system (other dust management initiatives are described in **Section 6.5.6**).

The stockpile management of multiple products requires the flexibility to stockpile any ore type into any stockpile. The conveying system design from the new car dumpers to stockyard provides this flexibility for both CD3 and CD4 to convey ore to all four of the stackers at Parker Point.

There is no planned expansion to the live storage capacity of the stockyard. The current works will provide an increase in the conveyor capacity of existing yard conveyors and a minor additional bulk storage capacity (0.3 Mt) that may be utilised in the future.

Bulking areas will be available to the north of current stockyard (1.5 Mt capacity), to the east of the stockyard (existing – around 1 Mt capacity), with a small additional area (0.3 Mt capacity) set aside to the northeast of the stockyard. The northern bulk stockpile can be stacked using an existing stacker; however, the material will be trucked to an existing hopper for bulking in to the circuit in the live stockyard. The stacking of product on the northern bulk stockpile allows routine live stockpile dust controls (e.g. water cannon) to be applied to this bulk stockpile. This enables greater control of the bulk area compared to most bulk areas.

Bulking is a significant operational cost and an environmental management challenge. As such, active management continues to minimise bulking. Nonetheless bulking provides a level of flexibility necessary to sustain long term, efficient operations and maximise shareholder value.

There are three levels of bulking conducted within the Dampier based operations.

Operational bulking is used to remove trains of material from the stockyard for special handling. Reasons for this may include preparation of trial shipments or specific quality management issues. Operational bulking may also include occasions when a train is available for dumping, without an appropriate stockpile available for blending. Scheduling actively works to minimise these conflicts through stockyard management and train diversions to alternate dumpers. Despite the additional costs and complexities of bulking, this invariably remains a more effective option than significantly delaying the dumping of that train.

Tactical bulking is the manual movement of product into and out of the stockyard to address either short term market biases toward different products, or movement to address capacity imbalances. Market biases between products can result in the stockyard becoming quickly product bound; this may require rail and mine production to be reduced. Capacity imbalances can occur when major shuts or unplanned losses generate a mismatch between port supply and demand.

Strategic bulking is an activity which typically occurs on a long term cycle. In periods of low demand, but sustained high production, excess product is removed from the stockyard and stored, for reverse movement when the market cycle swings. This allows the mines to operate at effective levels, while allowing the business to prepare for when the cycle reverses. This is not predicted to occur in the short to medium term, however has been a critical part of previous business success. Strategic bulking only occurs when all market demand has been satisfied.

3.6.1 Wharf

No additional construction work on the wharf beyond that already approved is required.

3.6.2 Earthworks

No additional land clearing beyond that already approved is required.

3.6.3 Water Consumption

Water is primarily used for dust suppression. The increased throughput at the Dampier operations will increase water demand from 2.16 GL pa (estimated for the 120 Mtpa case) to 2.52 GL pa (predicted for the 145 Mtpa case). The existing Dampier town and rail water demand will remain around 0.75 GL pa. The additional water will be required for dust control measures associated with the existing and additional stockpile water cannons at Parker Point and East Intercourse Island, water sprays for conveying and other sprays for improved handling during the process.

Whilst the throughput of iron ore through Dampier is increasing by 21%, water consumption is expected to increase by 17%.

3.6.4 Operations Organisation and Manning

There will be no significant change to the organisational structure of the port operations. There will be a small increase in the number of technical support staff, particularly in the mechanical area.

4. Community Consultation

4.1 Introduction

Hamersley Iron recognises that increasing the overall throughput of the Dampier Port operations to 145 Mtpa has the potential to cause impacts on the local environment and community. It is recognised in the approval process that stakeholders from the community and government agencies have sufficient information to enable them to make an informed assessment of the potential effects resulting from the proposal. Similarly, Hamersley Iron is cognisant of stakeholders' concerns and takes their views into account. Therefore, the stakeholder and community consultation program has been designed and implemented to facilitate these outcomes.

4.2 The Ongoing Consultation Programme

Hamersley Iron has implemented an on-going community consultation strategy in support of its operations and projects at Dampier and Cape Lambert. The following summarises the consultation processes that are undertaken by Hamersley Iron in relation to the Dampier proposal.

The consultation program originally initiated for the 95 Mtpa upgrade has continued throughout the 120 Mtpa upgrade and 145 Mtpa proposed upgrade. The program is in place to brief stakeholders and gain feedback on the performance of the port operations.

The consultation program includes:

- Briefings to government agencies and the Shire of Roebourne;
- Public displays held in Karratha and Dampier including open days and information displays;
- Presentations to and discussions with members of the Coastal Community Environmental Forum (CCEF);
- Quarterly meetings with key representatives from the Shire of Roebourne and Pilbara Regional Office of the DEC;
- Dampier/Karratha Community Advisory Group meetings for local residents;
- Technical and general presentations to government and community groups, such as the Dampier Community Association;
- Annual community forums where the format of formal presentation has recently been replaced with open forums chaired by an independent facilitator;
- Commercial tours of the Dampier Port Operations;
- Site visits and tours of the existing operation and/or construction areas;
- Monthly inserts (e.g. 'Unearthed) in the local Pilbara News newspaper with coastal and inland coverage providing items of local interest to the community, including aspects of the port upgrades; and

- Visits to residents that register complaints on the 1800 communications line.

Regular meetings are used to inform stakeholders of Pilbara Iron projects and initiatives including the Dampier Port upgrade and throughput capacity increases. This has also been applied to recent Cape Lambert port upgrades. Three key community groups with which Pilbara Iron meets regularly are:

- Coastal Community Environmental Forum (CCEF). The CCEF absorbed the functions of the Dampier Samson Dust Working Group in 2003. The committee meets every six months and is made up of members from the Shire of Roebourne, various government agencies, the Dampier Port Authority, Pilbara Iron, Dampier Salt, Dampier Community Association, various community representatives and some others by invitation.
- Dampier/Karratha Community Advisory Group, which was formed in 2003 to provide a forum for interaction between Hamersley Iron and members of the Dampier and Karratha community, including the Shire of Roebourne.
- DPU quarterly meetings with representatives of the Shire of Roebourne and DEC Pilbara Office.

In addition, monthly meetings have been conducted with the Shire of Roebourne to discuss a range of issues relevant to both parties. These meetings, initiated since late 2005, involve the CEO, President and senior executive managers from the Shire of Roebourne, as well as General Managers and Managers from Pilbara Iron. These meetings often discuss matters relating to upgrades of Dampier and Cape Lambert.

Key issues that are regularly raised in community consultation meetings in regard to upgrading the Dampier Port Operations include:

- Dust levels within Dampier;
- Dust suppression measures;
- Noise levels within Dampier
- Noise reduction initiatives being implemented;
- The availability of water;
- Aboriginal heritage;
- Noise from pile driving;
- Management of contractors and aspects relating to the contractor camp such as number of occupants, work rosters (days off);
- Construction and approvals updates; and
- Marine activities – i.e. artificial reef construction and dredging.

4.3 Community Surveys

4.3.1 Dampier Samson Dust Working Group Dust Survey 2001

In July 2001, Hamersley Iron, as a member of the Dampier Samson Dust Working Group, commissioned a survey of Dampier and Karratha residents (as well as those at Wickham and Point Samson) to understand dust concerns of the Dampier residents, compare Dampier and Karratha concerns, and to create a benchmark for future research. The survey indicated a clear difference in attitudes towards dust in Karratha and Dampier. Dampier residents were generally more concerned about dust, would like to become more actively involved in dust monitoring, and felt Hamersley Iron was a large contributor to dust levels. Karratha respondents were less concerned about dust, did not want to be involved in monitoring, and viewed the landscape as a bigger contributor to dust levels than Hamersley Iron Operations. In response to the survey, Hamersley Iron revised their Consultation Programme implementing additional community consultation activities.

4.3.2 Dust and Noise Community Survey 2006

An independent Dust and Noise Community Survey of the coastal towns of Dampier, Karratha, Roebourne, Wickham and Point Samson was undertaken in May 2006. The survey was undertaken by Paterson Market Research who were commissioned by Pilbara Iron. The survey scope, methodology and compilation of survey questions were developed with input from the membership of the CCEF. The survey was designed as a simple questionnaire where the community were presented multiple choice questions and requested to circle the response that best reflected their views. It covered the following aspects:

- General information;
- Dust issues;
- Noise issues; and
- Communicating concerns about noise and dust.

The Dust and Noise Community Survey builds on the 2001 survey conducted in Karratha, Dampier, Wickham and Point Samson (refer to **Section 4.3.1**).

A report on the survey results has been documented in **Appendix A** along with the questionnaire. In addition, a six page summary of the Dust and Noise Community Survey was prepared and issued for public distribution. The six page summary is also provided in **Appendix A.**

The data was collected via a self-completion survey. A total of 6,115 surveys were distributed and a total of 616 completed surveys were returned. This equates to an overall response rate of 10%. Given the response, results should be considered as indicative. Below are the main findings from respondents on their opinions of dust and noise issues in their area. Reference should be made to the full report (**Appendix A**) for a more comprehensive presentation of the 2006 survey findings.

Dust Issues

The response to dust issues varied according to location, with Karratha, Wickham and Roebourne respondents indicating dust didn't bother them much, whereas a larger proportion of Dampier and Point Samson respondents (affected by the Cape Lambert Operation) indicated dust upsets them a lot. The response to dust is summarised below:

- Karratha and Wickham respondents were more likely to report that Pilbara Iron's dust impact was "hardly noticeable", whereas Dampier respondents were more likely to indicate Pilbara Iron was a "really major cause" of dust in their area compared to other possible sources.
- Overall, 22% of respondents indicated that dust didn't bother them, 25% felt dust was a minor irritation and 18% indicated it upset them a lot.
- Overall, 45% felt that the dust impact has stayed the same over the last five years, while 29% felt it had worsened. This contrasted to Dampier residents, where 29% considered that dust had stayed the same and 48% considered that dust had got worse.
- Respondents indicated that their greatest concern regarding dust at their home was that it makes their house, car or boat dirty.
- Stockpiles and conveying ore from stockpiles were seen as the two main causes of dust from Pilbara Iron's operations.

Noise Issues

As with dust, the response to noise issues varied according to location, and the responses to noise issues is summarised below:

- Overall, 55% of respondents indicated that noise didn't bother them much, 22% found noise a minor irritation from time to time and 4% felt noise upsets them a lot of the time.
- Half of the respondents reported that the noise in their area had stayed the same over the last five years, while 23% felt it had worsened. Almost half of the Dampier respondents felt that noise had worsened over the last five years.
- Overall, 43% of people indicated that Pilbara Iron contributes less of the total local noise than other sources, however, 36% believed the company's port operations contribute more to the noise issues than any other source.
- 74% of Dampier respondents felt that Pilbara Iron contributed more noise than other sources.
- 49% of respondents felt that they did not know enough about Pilbara Iron's noise management to be able to comment further. 28% believe that Pilbara Iron's noise management had achieved the "correct balance between noise generation and production." 24% believed that Pilbara Iron should be doing more to reduce noise.
- Warning beeps on reversing vehicles in town were reported as the most common source of noise from Pilbara Iron's operations.

Communication concerns about noise and dust

- Very few people had raised their concerns about dust with Pilbara Iron, with 85% of respondents having never raised concerns, 11% having raised their concerns once or a few times and 4% of respondents had raised their concerns frequently.
- Very few concerns had been raised about noise, with 6% of respondents having raised their concerns once or a few times and 3% of respondents had raised their concerns frequently.
- 25% of respondents were aware of Pilbara Iron's Communication's Line toll-free number 1800 445 465
- Dampier residents were far more likely to contact Pilbara Iron directly with a concern, while residents from other areas were more likely to raise their concern with the Shire.

4.4 145 Mtpa Upgrade Consultation

Existing consultation mechanisms have been utilised to provide stakeholders with information regarding the proposed increase in throughput to 145 Mtpa, and to receive feedback on the issues of concern. This approach was viewed as being most effective in maintaining consistency and building on existing relationships between Hamersley Iron and stakeholders.

The following sections outline the consultation strategy implemented for the 145 Mtpa proposal.

4.4.1 145 Mtpa Proposal - Stakeholder Identification

The key stakeholders for the proposal to increase throughput to 145 Mtpa were identified from Hamersley Iron's ongoing consultation program for the Dampier Port 95 Mtpa Upgrade and 120 Mtpa Upgrade Projects.

The key stakeholders that were identified included the:

- Dampier, Karratha and surrounding area residents;
- Dampier/Karratha Community Advisory Group;
- Department of Environment and Conservation;
- Environment Protection Authority Service Unit (EPASU);
- Department of Industry and Resources;
- Water Corporation;
- Dampier Port Authority;
- Shire of Roebourne;
- Dampier Community Association; and
- The local Hamersley Iron workforce.

4.4.2 145 Mtpa Proposal Consultation Programme Methods

The consultation programme focussed on providing detailed information and seeking feedback from those key stakeholders either participating in the environmental approval process or likely to be affected by the project. These stakeholders were provided with project information using technical presentations, briefings and site visits. Other stakeholders less likely to be directly affected were provided with general information.

Each consultation method was selected as appropriate to the interests, knowledge base, needs and likely level of impact upon the particular stakeholders, in the context of Hamersley Iron's ongoing consultation programme. The 145 Mtpa consultation programme generally follows the 95 Mtpa and 120 Mtpa upgrade consultation methods and includes similar activities discussed above such as open days, meetings, presentations etc.

4.4.3 Consultation Schedule

A summary of the community consultation program, showing the stakeholders consulted and the consultation methods is given in **Table 4-1**. As evidenced by **Table 4-1**, an extensive consultation program was undertaken employing several communication processes. Although the briefings/presentations frequently initiated detailed discussions, there were common themes amongst the queries/concerns raised during the process. **Table 4-2** presents the main issues/concerns raised during the consultation process associated with the Dampier Port Increase in Throughput to 145 Mtpa. Where appropriate, Hamersley Iron's response is also presented.

- **Table 4-1 Summary of the community and stakeholder consultation program.**

Stakeholder	Location	Date	Consultation Method
WA Government			
Department of Environment and Conservation/DEC	Karratha	31/08/2005 14/10/2005 27/11/2006 2/03/2007	Project Briefing Discussion on status of s45C application Briefing on status of 145 Mtpa environmental approvals Project briefing and update
EPASU	Perth	19/9/2005 6/12/2005 31/05/2006-01/06/2006	Project Briefing Site Visit
Department of Industry and Resources – Environment Section	Perth	20/10/2005	Project Briefing
Department of Industry and Resources – Office of Major Projects	Perth	7/12/2005 8/02/2006 8/03/2006 7/04/2006 3/05/2006 7/06/2006 13/07/2006 9/08/2006 6/09/2006	Regular meetings in which status of the port upgrades raised and discussed

Stakeholder	Location	Date	Consultation Method
		5/10/2006 1/11/2006 06/12/2006 07/02/2006 07/03/2007 13/04/2007 09/05/2007	
Water Corporation	Perth/ Karratha	26/08/2005 9/08/2006 16/11/2006	Project Briefing Update on status of water demand modelling West Pilbara Water Demand Management Stakeholder committee meeting, t
Shire of Roebourne	Karratha	14/10/2005 27/11/2006	Project Briefing, Discussion on status of s45C application Briefing Shire with dust and noise modelling outcomes
Dampier Port Authority	Dampier	10/02/2006	Project Briefing and sent letter, copy of posters presented at Open Day and feedback form
Department of Planning and Infrastructure	Karratha	9/09/2005	Project Briefing
Minister for Environment	Dampier	9/09/2005	Project Briefing and site visit
King Bay Users			
Burrup Fertilisers (Operations)	King Bay-Hearson Cove Industrial Park	14/12/2006	Project Briefing
Burrup Fertilisers (Corporate)	Perth	07/03/2007	Project Briefing
Woodside	Burrup Peninsula	15/12/2006	Project Briefing
Dampier Port Authority	King Bay	15/12/2006	Project Briefing
Local Community			
DPU Stakeholder Consultation Programme – quarterly meetings with Shire of Roebourne and DoE/DEC	Dampier	12/10/2004 23/03/2004 26/05/2005 13/07/2005 06/09/2005 14/12/2005 19/04/2006 18/08/2006 22/11/2006 21/03/2007 10/07/2007	Project Briefing and updates on the various upgrades and construction works Combined with CCEF Next Scheduled
Local residents	Karratha/ Dampier Karratha Dampier	15/10/2005 2-3/02/2006 5-6/08/2006 1/08/2006	Dampier Operation Open Day Public information display at Karratha and Dampier Shopping Centres, Handout information, collection of feedback on issues FeNaCLNG manned display Dampier Community forum discussion – opportunity for community and management of Pilbara Iron to meet, raise issues of concern, provide feedback and plan for further action.
Dampier/Karratha Community Advisory Group	Dampier	27/06/2005 22/08/2005 24/10/2005 12/12/2005 13/02/2006	Briefings and presentations on project outline and approvals process Briefing on approval status and planning Outline of issues raised during consultation program and from newsletter and reiteration of dust and noise modelling

Stakeholder	Location	Date	Consultation Method
		27/03/2006	
		10/05/2006 24/07/2006 28/08/2006 16/10/2006 27/11/2006 19/02/2007 30/04/2007	Discussions on project impacts, consultation activities and approval process. Issues raised through members included questions on dust impacts on health and construction noise. Status of the 145 Mtpa approvals and construction Status of 145 approval and construction Status of 145 Mtpa approvals and construction
Coastal Community Environmental Forum	Point Samson Dampier Dampier Dampier	28/09/2005 22/03/2006 11/10/2006 21/03/2007	Briefing on project outline, assessment status and presentations on specific issues of noise and dust and water
Dampier Community Association	Dampier	28/11/2005	Presentation of Operations and dust/noise controls
Department of Planning and Infrastructure – Regional Office	Dampier	10/2/2006	Project briefing – land and marine works
Department of Planning and Infrastructure – New Coastal Assets Branch	Perth	10/02/2006	
Dampier Port Authority	Dampier	10/02/2006	Sent letter, copy of posters presented at 2-3/02/2006 Open Day, including Feedback Form
Hampton Harbour Boat and Sailing Club - Commodore	Dampier	10/02/2006	
Department of Environment , NWR Office	Karratha	10/02/2006	
Hampton Harbour Boat and Sailing Club - member	Dampier	10/02/2006	
Hampton Harbour Boat and Sailing Club - Committee	Dampier	10/02/2006	
Shire of Roebourne – Planning Manager	Karratha	10/02/2006	Sent to different councillors or officers
Shire of Roebourne - Councillor	Dampier	10/02/2006	
Shire of Roebourne - Councillor	Point Samson	10/02/2006	
Shire of Roebourne - Councillor	Dampier	10/02/2006	
Pilbara Area Consultative Committee	Karratha	10/02/2006	
Department of Fisheries	Karratha	10/02/2006	
Department of Conservation and Land Management	Karratha	10/02/2006	
Dampier Archipelago Dwellers Association	Karratha	10/02/2006	
Woodside Marine	Perth	10/02/2006	
Australian Maritime Systems Ltd	O'Connor	10/02/2006	
King Bay Game Fishing Club	Karratha	10/02/2006	
Discovery Sailing Adventures	Karratha	10/02/2006	
Dampier Island Tours	Dampier	10/02/2006	
Blue Destiny Charters	Karratha	10/02/2006	
North West Game Fishing Club	Karratha	10/02/2006	
Dampier Community Association	Dampier	10/02/2006	
Water Corporation	Karratha	10/02/2006	
Conservation Council of Western Australia	West Perth	10/02/2006	
Dampier Archipelago Preservation Association	Karratha	10/02/2006	
Department of Industry and Resources - Environment	Perth	10/02/2006	

Stakeholder	Location	Date	Consultation Method
Department of Industry and Resources – Office of Major Projects	Perth	10/02/2006	
Fire and Emergency Services Authority (WA)	Karratha	10/02/2006	
Karratha and Districts Chamber of Commerce and Industry	Karratha	10/02/2006	
Karratha Visitors Centre	Karratha	10/02/2006	
Karratha Dive School	Karratha	10/02/2006	
Main Roads WA	South Hedland	10/02/2006	
Nickol Bay Naturalists Club	Karratha	10/02/2006	
Nickol Bay Sport Fishing Club	Dampier	10/02/2006	
Office of Energy	Perth	10/02/2006	
Department of Industry and Resources – Infrastructure Projects	Perth	10/02/2006	
Pilbara Wildlife Carers Association	Karratha	10/02/2006	
St John Ambulance	Karratha	10/02/2006	
West Pilbara Health Services/Nickol Bay Hospital	Karratha	10/02/2006	
West Pilbara Sea Search and Rescue	Dampier	10/02/2006	
Tourism WA	Karratha	10/02/2006	
Woodside Energy Limited	Karratha	10/02/2006	
Burrup Mountain Bike Club	Karratha	10/02/2006	
Pilbara Development Commission	Karratha	10/02/2006	
Pilbara Development Commission	Port Hedland	10/02/2006	
Australia's North West Tourism	Karratha	10/02/2006	
Australian Customs Service	Dampier	10/02/2006	
Dampier Police	Dampier	10/02/2006	
Dampier Volunteer Fire and Rescue Service	Dampier	10/02/2006	
Pilbara TAFE	Karratha	10/02/2006	
Western Power	Karratha	10/02/2006	
Conservation Commission of WA	Crawley	10/02/2006	
Dampier Primary School	Dampier	10/02/2006	
Karratha Centro	Karratha	10/02/2006	
Karratha Volunteer Fire and Rescue Service	Karratha	10/02/2006	
Lions Club of Karratha and Dampier	Karratha	10/02/2006	
Karratha Primary School	Karratha	10/02/2006	
Karratha Senior High School	Karratha	10/02/2006	
Karratha Medical Centre	Karratha	10/02/2006	
Peninsula Palms	Dampier	10/02/2006	
Millars Well Primary School	Karratha	10/02/2006	
St Paul's Primary School	Karratha	10/02/2006	
Tambrey Primary School	Karratha	10/02/2006	
St Lukes College	Karratha	10/02/2006	
Pegs Creek Primary School	Karratha	10/02/2006	
Wong-Goo-Tt-Oo	Roebourne	10/02/2006	
Ngarluma Yinjibarndi Foundation Ltd	Roebourne	10/02/2006	
Dampier Sports Club	Dampier	10/02/2006	
Yabburara Mardudhunera Group	Wickham	10/02/2006	
The Pilbara Regiment	Karratha	10/02/2006	
Marine and Coastal Community Network	West Perth	22/2/2006	

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- **Table 4-2 - Summary of the issues raised during community and stakeholder consultation and Hamersley Iron's responses.**

Organisation	Issue/Comment	Proponent Response
EPA/EPASU	What further increases at Dampier and Cape Lambert are anticipated	At the time that this issue was raised, the maximum capacity was to be 220 Mtpa (Dampier and Cape Lambert combined), but since then, evaluation studies have commenced to examine further options to increase that beyond 220 Mtpa. No decisions have been made on volumes or locations.
	Main issues for Environmental assessment for this proposal will be dust, noise, water availability	Dust issues are addressed in **Section 6.5** of the EPS, noise issues are addressed in **Section 6.6** of the EPS and water availability is addressed in **Section 6.7** of the EPS.
	The target for dust levels for this proposal should be no change to that for 95 Mtpa	The dust levels for this proposal are outlined in **Table 6.13** & **6.14**.
	An EPS is the likely level of assessment for increase in throughput to 145 Mtpa	Based on the outcome of dust, noise and water and greenhouse modelling and the extent of consultation undertaken, this level of assessment would appear appropriate.
	Should consult with relevant agencies on water supply and water allocation	Key agencies for water supply and allocation have been consulted (refer **Table 4.1** of EPS and this table).
	Clarification sort whether dredging will form part of the scope of increasing throughput to 145 Mtpa	Dredging has been subjected to separate environmental assessment. The scope of dredging will assist achieve the intended throughput.
	Recommended using results of the Port Hedland health study	Key findings of the Port Hedland health study have been incorporated into **Section 6.5.2** of the EPS.
	Community survey recommend that the community dust and nose survey should be done and incorporated into EPS	The community dust and noise survey is provided in **Appendix A** of the EPS.
	Recommended that the Air Quality Branch of the DEC considers any changes in the model used (Ausplume vs Calpuff).	The Air Quality Branch is aware of the change in model from Ausplume to Calpuff.
Dampier/Karratha Community Advisory Group	Issues associated with anti-social behaviour and safety to Dampier residents from influx of contractors in Dampier.	It was advised at the meeting that contractors that cause anti-social behaviour needed to be identified so that appropriate actions can be taken to address these issues.
	Noise associated with pile driving	Pile driving actives associated with the wharf construction were revised to operate during daylight hours (unless safety requirements dictated otherwise).
	What are the noise and dust implications of increasing throughput to 145 Mtpa	The dust modelling is presented in **Section 6.5** while the noise modelling is presented in **Section 6.6** of the EPS. Presentations on noise and dust have been provided on various occasions in 2006. Updates on the status of construction and approvals and topical issues were also provided at every meeting.
	How will noise from train activities affect noise levels	This issue is addressed in **Section 6.6.6** of the EPS.
	The community lines/infrastructure help desk 1800 numbers has not been well publicised	The option of combining all PI numbers (maintenance, cyclone information/ community line etc) into one number and handling/directing calls through a call centre is being reviewed.
	How is foreign marine species being managed to prevent the illegal release of ballast water	Ship captains are required by law to discharge ballast water on route to port.
	How is dust monitoring to be upgraded	The enhanced dust monitoring is outlined in **Section 6.5.8** of the EPS.
	How will the findings of the dust and noise survey be incorporated into Pilbara Iron operations	Key elements identified from the dust and noise survey are to be addressed in future internal improvement plans which will be tabled and discussed at CCEF meetings.
	Will the operational workforce increase	There will be a marginal increase in the size of the operational workforce (from 440 to 445 – refer **Table 3.1** of the EPS).
CALM/ DoE/DEC	What additional areas would be cleared	No construction is required to achieve 145 Mtpa throughput, therefore no additional areas would be cleared.
	Will PI use the PACU process for obtaining environmental approvals for increasing throughput to 145 Mtpa	The approvals process for this proposal will not require the PACU process as the proposal is relatively straight forward.
	EPS will need to compare 145 Mtpa dust levels against NEPM standards	The dust levels associated with increasing throughput to 145 Mtpa have been compared against NEPM standards (Refer **Table 6.13** and **Table 6.14**).
	Water supply may be a significant issue as the probability of Harding Dam getting significant top up soon is not high	Water supply is addressed in **Section 6.7** of the EPS. The Dampier Operation sources its water from the Water Corporation which is responsible for water supply in the region. Harding Dam has been replenished by cyclone/s since that issue was raised, but Hamersley Iron remains aware of the demand on water supplies in the area.

Organisation	Issue/Comment	Proponent Response
DPU quarterly meeting with Shire/DoE	Why PI didn't make more use of EII berth/wharf area as it may be superior to PP berth area	Parker Point Port was considered the preferable option for increasing throughput on the basis of economic, environment and social grounds. The East Intercourse Island berth/wharf area could not provide the additional throughput required without considerable additional infrastructure. There is also a risk of significantly increased dust on Dampier from expanded ore handling facilities at East Intercourse Island.
	Clarification of timing/approvals	Updates on status environmental approvals and other issues were presented to the meeting on a quarterly basis. The current project schedule is outlined in **Section 1.6** of the EPS.
	Shire requested a briefing on dust and noise modelling of increasing throughput to 145 Mtpa and an opportunity to review the draft EPS prior to finalisation.	A briefing on dust, noise and water modelling was provided to the Shire on 27th November 200. The Shire was issued a draft copy of the EPS for review in December 2006 and a commitment made to provide a copy of the updated EPS as well.
	The Shire of Roebourne should be advised if any spare capacity becomes available at the Parker Point Camp for possible non-DPU personnel	Updates on camp capacity were provided at each quarterly meeting. To date the camp has remained at over capacity with overflow being accommodated at external facilities.
	Request additional information on the chemical dust suppressant being used at Dampier	Requested information on DustMag provided.
	Management of dust associated with increasing throughput to 145 Mtpa	Predicated dust levels and dust management are addressed in **Section 6.5** of the EPS.
Minister for Environment	Clarification of the approvals approach for increasing through input to 145 Mtpa	Key infrastructure elements to enable 145 Mtpa capacity were approved under Section 45C and Part V (Works Approval) while approval to operate at 145 Mtpa to be formally assessed under Part IV of the EP Act.
	What are the implications for dust and noise from the increasing throughput 145 Mtpa	The changes in dust and noise emissions associated with this proposal are outlined in **Section 6.5** & **6.6** of the EPS.
	What are the future plans for Dampier Town	No specific plans are in place to expand the town of Dampier, however additional accommodation will continue to be required in the local region to meet construction and operational workforce requirements.
Department for Planning and Infrastructure	Has any work had been undertaken to determine the impact of dust emissions on Aboriginal rock art near Dampier.	The Burrup Rock Art monitoring study is undertaking this work with partial funding from Pilbara Iron and other industries.
	Planned coral translocation and artificial reef should be well received by the local community	Outside scope of this EPS, but agree with comment.
	Artificial reef should not pose risk to boating activities around Parker Point.	Outside scope of this EPS, but artificial reef will not pose risk to boating activities due to location/depth of placement .
	Will ELI spoil ground result in exposure at low tide as this may pose a safety issue to recreational boat users	Outside scope of this EPS (covered by separate assessment/Ministerial Statement) but ELI spoil ground will not be exposed at low tide upon of completion of dredging.
CCEF	Whether DPU Phase B would be sufficient for Hope Downs	DPU 145 would provide efficient capacity to accommodate future mine developments, including Hope Downs.
	Nature of dust monitoring and web site data availability	The enhanced dust monitoring program is outlined in **Section 6.5.8** of the EPS.
	Clarification whether dust monitoring data was being made available to the Burrup Rock Art monitoring study	Dust levels were not a key focus of this study but dust monitoring results could be made available if requested by the study group.
	Noted that dust modelling suggest NEPM target value may be exceeded at King Bay	NEPM levels will not be exceeded (refer **Table 6.13** & **Table 6.14**).
	Impactions of Port Hedland Dust Study in Dampier	Port Hedland dust study to remain on CCEF agenda for future meetings with a working group to liaise with BHP on target setting for dust.
	Frequency of noise and dusty surveys to be increased (Ministerial requirement for at least every 5yrs) to every 2yrs	Every 5years for the survey is considered appropriate of the basis other forms of community liaison are also used (such as community liaison meetings) allowing issues to be raised.
	Incorporate the dust and noise surveys into corporate management	Key areas for improvement are being incorporated through annual improvement plans.
	What will be the maximum capacity for Cape Lambert and Dampier	At the time that this issue was raised, the maximum capacity was to be 220 Mtpa (Dampier and Cape Lambert combined), but since then, evaluation studies have commenced to examine further options to increase that beyond 220 Mtpa. No decisions have been made on volumes or locations.
	Social impact study associated with Iron Ore through the Ports is needed (including Health effects of dust)	The data form the Port Hedland dust review and outcomes from the Senate review into assessing toxic impacts in the work place will be reviewed before any commitments will be made.

Organisation	Issue/Comment	Proponent Response
Open Day/ Information days	Employment opportunities	Employment opportunities will increase during construction works and marginally for operational phase.
	Project scope and timing	Project scope and timing outlined at the time of each forum. Project scope - refer to **Section 3** of the EPS. Project timing - refer to **Section 1.6** of the EPS.
	Dust control associated with the proposal	Dust management associated with this proposal is outlined in **Section 6.5.6**.
	Noise management associated with the proposal	Noise management associated with the proposal is outlined in **Section 6.6.7** & **6.6.8**.
DOIR Environment Section	Clarification sought on various aspects of scope at PP and EII, namely scope of environmental initiatives (mainly dust and noise controls) and what was being built for each phase.	The scope of dust management initiatives is provided in **Section 6.5.6** of EPS. The scope of the noise management initiatives is addressed in **Section 6.6.7** of the EPS. The scope of all upgrade works was outlined in the briefing. The scope of increasing throughput to 145 Mtpa is outlined in **Section 3** of the EPS.
	Commented that environmental initiatives appear to be extensive	Comment noted.
	Commented that the consultation undertaken and planned appears to be comprehensive	Comment noted. Community consultation is summarised in **Table 4.1** of the EPS.
	Clarification sought whether PI was likely to be sourcing its own water supply In the future	PI will continue to source its water from the Water Corporation for the foreseeable future.
Responses from poster mail out	Fire and Emergency Services Authority (WA) - FESA welcomes the opportunity to liaise with the Project team on emergency preparedness, especially identified project emergency risks, expectations of FESA in the advent of a major incident and FESA's response capabilities. The intention would be to assist RTIO to develop robust emergency arrangements for the impending construction works.	The RTIO EP team and FESA liaised on managing this issue.
Responses from poster mail out	Dampier Port Authority – sought public feedback on the proposal from consultation undertaken. Sought future expansion plans by Hamersley Iron. Sought details of dredging plans (including sediment contamination related to dredging). Requested that Hamersley Iron develop its land holdings for additional housing, commercial office space, retail and tourism and light industry to support the planned development in the port – alternatively the DPA would support the release of the land in Dampier to allow the private sector to fulfil demands created by the proposed upgrade	Summary of consultation provided in **Section 4** of the EPS. Short term to medium term plans for expansion have been provided to DPA through meetings and briefings. Copies of all dredging applications and supporting plans have been provided to the DPA. Status to the design works for the Parker Point Service Wharf was provided to the DPA at a meeting in November 2005 and through various contacts since then. Hamersley Iron will develop its land holdings in accordance with proposed expansion development plans as they arise.
Responses from poster mail out	Main Roads Western Australia - The vehicular movements generated by the expansion are of particular interest to organisation. Requested details on the frequency, number and type of vehicle movements using the Parker Point Road and Dampier Hwy intersection currently, during construction and post construction.	The RTIO EP team and MRWA liaised on this issue. The requested information was provided to MRWA.
Burrup Industries (Burrup Fertilisers, DPA, Woodside)	Source of meteorological data applied by Pilbara Iron requested	Information provided – Bureau of Meteorology and DPS site.
	Are dust suppressants agents used in the Dampier operations	Dust suppressants are used for Dampier Operations.
	What dust monitoring is undertaken by Pilbara Iron	**Section 6.5.8** of the EPS outlines Hamersley Iron Dust existing and planned enhancement of the dust monitoring program.
	Will the proposal require Pilbara Iron to exceed the allowed water allocation	The predicated water demand will be within the current permitted water allocation.
	What will the effect of easterly winds be on the town of Dampier	The issue of impact on dust on the Town of Dampier is addressed in **Section 6.5.4.3** and **Table 6.13**.
	Is there an issue with dustier ores being received n Dampier	The dust modelling outlined in **Section 6.5** of the EPS takes account of dustier ores to be received at Dampier from the mines.
	What will be the effect of the proposal on the water usage efficiency	The outcomes of water modelling and the effect on water efficiency are presented in **Section 6.7.5** and **Table 6.27** of the EPS.
	Will a desalination plant be feasible to supply water to Dampier	A desalination plant to provide water for dust control is unlikely to be economically feasible. Continued improvements in water efficiency and implementation of appropriate opportunities to re-use and recycle water are avenues for reducing demand.
	Is there a dust monitor to the east of Parker Point	The Burrup rock art monitoring study has a site to the east of Parker Point (site 8) that will continue to monitor dust under the extended monitoring program.
	Will Aboriginal heritage sites be impacted by the proposal	The proposal to increase throughput to 145 Mtpa will not directly impact on Aboriginal heritage sites. The issue of rock art and dust deposition and monitoring for these is addressed in **Section 6.4.3** of the EPS.

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4.4.4 Key Stakeholder Consultation

The following sections provide details of the consultation undertaken with the key stakeholders for the proposal to increase throughput to 145 Mtpa.

4.4.4.1 Dampier/Karratha Community Advisory Group

Since around August 2005, frequent updates and outlining of the status of Hamersley Iron's plans to increase throughput have been made to meetings of the Dampier/Karratha Community Advisory Group, to provide information on the current construction works, on the current proposal, and to receive feedback on issues of concern. Meeting dates are provided in **Table 4-1**.

General discussions have included the issue of increased noise from brake cars. Concern with contractors in Dampier posing the risks of anti-social behaviour was also raised. Concerns were also raised at some Community Advisory Group meetings in relation to pile driving associated with the wharf extension. The Community Advisory Group raised the opportunity for technical experts involved in the artificial reef to link up with the Dampier Primary School in order to achieve some local educational benefit from this unique development.

4.4.4.2 State Government Agency Briefings

Key State Government agency stakeholders were briefed on the project and provided with opportunities to raise any issues. Both local and Perth based agencies were briefed where appropriate and included:

- Department of Environment/DEC;
- Environment Protection Authority Service Unit;
- Department of Industry and Resources – Environment;
- Department of Industry and Resources – Office of Major Projects
- Department of Conservation and Land Management/DEC;
- Water Corporation;
- Dampier Port Authority; and
- Department of Planning and Infrastructure.

A schedule of consultation dates and methods is given in **Table 4-1**.

In summary, key issues raised during consultation with these agencies were:

- Dust impacts including:
  - Need to include results of Port Hedland Health Study be undertaken on behalf Department of Health;

- Measures to be implemented to control dust;
- Any work undertaken with respect the impact of dust emissions on Aboriginal rock art near Dampier;
- Comparison of dust modelling outcomes against the NEPM standards;

- Water use issues, in particular the need to minimise water use and establish a strong culture of water re-use; and
- The recommendation that the results of the Community Dust and Noise Survey be included in the EPS.

4.4.4.3 Coastal Community Environmental Forum

The proposal to increase throughput to 145 Mtpa was first discussed at the CCEF meeting held on 28 September 2005. An update on status of technical studies, the status of projects subject to EPA or Commonwealth assessment (e.g. dredging), and ongoing work was also provided at the CCEF meeting on 23 March 2006. The regular presentation on dust, water and noise management was also made by the Manager of Dampier Port Operations at both these meetings. The plans for and approach for conducting the dust and noise community survey was also discussed at the March 2006 meeting, with comments sought from CCEF members on the content and scope of the questions, the distribution of the survey forms and the process for survey feedback.

The CCEF meeting on 11 October 2006 also contained a presentation on the outcomes of the dust, noise, water and greenhouse emissions modelling for the increase in throughput to 145 Mtpa. A presentation was also provided on the outcomes of the dust and noise community survey. The regular presentation on Dampier dust, water and noise management was also made by the Manager Port Operations.

A further update on dust, noise and water modelling, approvals, construction status was provided at the March 2007 CCEF meeting.

4.4.4.4 DPU Quarterly Meetings

Hamersley Iron has been holding regular meetings with the Shire and the Pilbara Regional Office of the DEC on a quarterly basis to inform these authorities on the progress of construction of the DPU project and other related issues. These meetings have been held every quarter since Q1 2004. Those meetings where the proposed increase in throughput or associated works were discussed is provided in **Table 4-1**. Some meetings were combined into the CCEF meetings when they fell around the same month. To date, approximately 10 meetings have been held and the program of meetings has kept to the agreed schedule.

The DPU quarterly meetings involve a review of previous action items, a presentation of the status of the current construction works and project timelines, a presentation on the on-site environmental management of the construction works, an outline/presentation on the status of the relevant

environmental conditions/commitments for the project, and a presentation on the status and outcomes of technical studies relating to the relevant port upgrade. Presentations on additional topics (e.g. the outcomes of the dust and noise community survey) are also made from time to time. At the conclusion of the meeting, a hosted site tour by bus of any area of the port that was of interest to participants is undertaken; this always includes the active construction area at Parker Point, but has also included aspects of East Intercourse Island or the 5E conveyor.

4.4.4.5 Shire of Roebourne

As well as participation in the CCEF and the Shire/DEC quarterly meetings, a series of monthly meetings have been conducted with senior management of the Shire of Roebourne since late 2005. These have been conducted to discuss matters of common interest to both parties. These meetings have regularly discussed port upgrades.

4.4.4.6 King Bay Industries

Hamersley Iron recognises the predicted increase in dust levels at King Bay due to operations at 145 Mtpa may impact current users of the area. As such Hamersley Iron has briefed the following organisations regarding the proposed increase in throughput to 145 Mtpa and the predicted impacts:

- Burrup Fertilisers (both Operations and Corporate);
- Dampier Port Authority; and
- Woodside Energy Ltd.

Efforts have also been made to brief Mermaid Marine with no success. Continued efforts, will be undertaken to provide a presentation and discuss the proposal.

4.4.4.7 Local Resident Consultation

Public Information Displays

Two public information displays were conducted, the first was held at the Karratha Centro shopping centre on 2 February 2006, and the second at the Dampier shopping centre on 3 February 2006. A bus tour of the Parker Point operations was also available from Dampier. The information displays provided details on both the progress of construction of the current 95/120 Mtpa Dampier Port Upgrade projects, and information on the proposed increase in throughput to 145 Mtpa. The site layout, the environmental approval process and potential environmental impacts were included in the display. The display information was also available in the form of printed handout material for interested parties. A copy of the printed hand-out material was posted to about 70 organisations in Dampier, Karratha, and Perth and other locations inviting feedback on the proposal (refer **Table 4-1**).

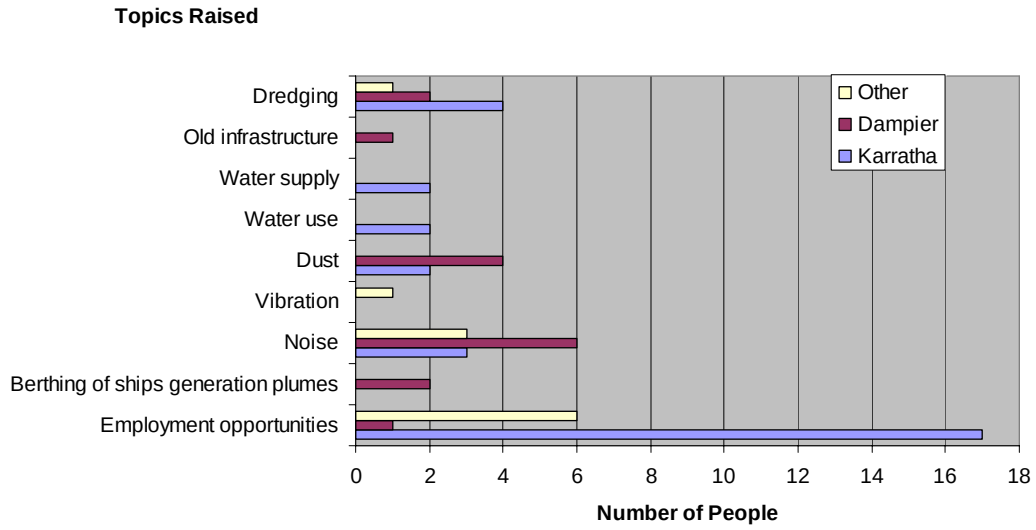
Both the Dampier and Karratha information displays were manned at all times by representatives from Hamersley Iron and SKM to provide an explanation of the information provided and to clarify

any questions raised. In addition, a record was kept of the residential location (Dampier, Karratha or Other) of interested parties, and any issues raised or positive comments offered. The majority of people had no issues with the project (**Table 4-3**)

- **Table 4-3 - Summary of the Community response to information days held in February 2006.**

Location	Positive Comment	No Issue	Issues of Concern
Karratha Total	2	49	3
Dampier Total	4	23	5
Other Total	2	24	1

Items of interest and issues raised by the public are summarised in **Figure 4.1.**



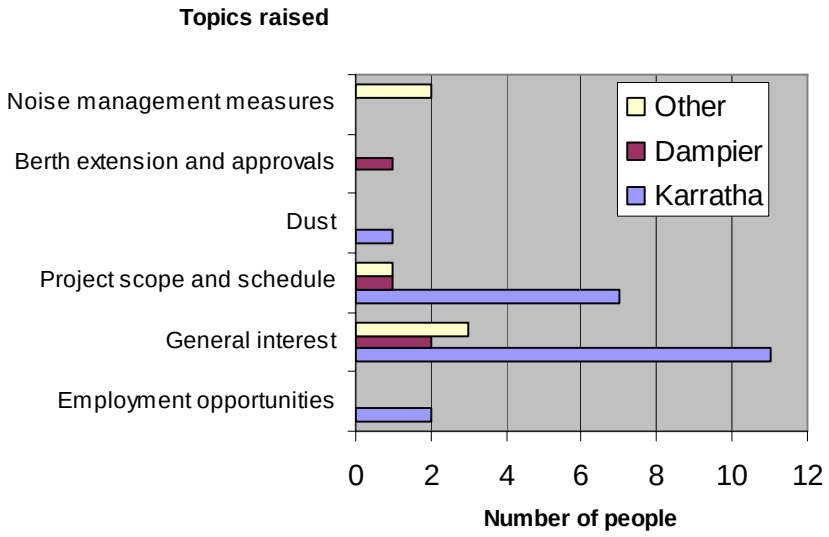
- **Figure 4.1 - Topics discussed during public information displays in Karratha and Dampier in February 2006**

Positive feedback received related to the employment and economic benefits of the project both to the local area and regional, as well as keeping the community informed on developments.

Open Day and Tour of Dampier Port and Rail Operations

On 15 October 2005, an Open Day was organised which included tours of the Dampier port and rail operations. It is estimated that 400 people attended, and of that, 37 Dampier/Karratha residents attended a manned display on the DPU and were invited to make comments on the proposed increase in throughput to 145Mtpa, construction works and environmental management performance. The majority of people expressed interest in the project scope and timing, with some

also querying dust and noise management. The issues raised by attendees are presented in **Figure 4.2**.



- **Figure 4.2 - Topics discussed during the open day in Dampier in October 2005**

FeNaClNG Festival – Information displays

A display was included as part of the FeNaClNG Festival held on the 5th and 6th of August 2006. The display outlined planned works associated with the increase in throughput, environmental management initiatives, outcomes of dust and noise community survey and provided a 'fly-over' simulation of the completed construction works at Parker Point. A total of 87 people attended the display and asked questions. Items discussed and issues raised are summarised below:

- Project overview and description;
- Dust issues (on boats and from 5E conveyor) and management of dust in general;
- Marine, wharf and dredging;
- Water use, management and alternative sources (i.e. seawater);
- Noise (pile driving and brake car noise);
- Work opportunities and economic development;
- Heritage; and
- Trains (numbers).

4.4.5 Outcomes of the Consultation Process

The major outcomes from the consultation program are:

- Development of a better mechanism to consult with the Dampier and Karratha community through the expanded role of the Dampier/Karratha Community Advisory Group;
- Potential for an ongoing role of the Dampier/Karratha Community Advisory Group in reviewing the environmental performance of Hamersley Iron's Dampier Operations;
- Greater awareness within the community of the environmental management initiatives being carried out by Hamersley Iron; and
- Greater awareness within Hamersley Iron of the level of concern amongst Dampier residents on environmental issues.

Specific environmental impact mitigation strategies have been developed by Hamersley Iron to address the key issues raised by stakeholders during the consultation program. Environmental management strategies for the key issues are detailed in the following sections:

- dust impact mitigation strategies are provided in **Section 6.5**;
- noise management is addressed in **Section 6.6**;
- water use issues are addressed in **Section 6.7**; and
- marine issues are addressed in **Section 6.8**.

4.5 Ongoing Consultation

Hamersley Iron will continue to hold regular meetings to inform stakeholders of projects and initiatives including the DPU and throughput capacity increases.

4.6 Community Participation

Hamersley Iron has participated in the local and regional community for the past 40 years through a diverse range of community support activities, and through the provision of a range of services and infrastructure types. The following describe the ongoing community participation activities carried out by Hamersley Iron:

4.6.1 Education and Training

Hamersley Iron supports a comprehensive community education and training program for the local Pilbara residents to help improve their learning outcomes. The company currently contributes either directly or indirectly to a wide range of community-based education initiatives throughout the North-West for school-aged children both inland and on the coast. Some prominent examples include the Gumala Mirnuwarni education program, Garnjurri Mirnumurri Ngurrungka Program, and a range of community education programs.

Increasing the overall diversity of the company's workforce is a key objective for Hamersley Iron. The company supports an extensive range of pre-employment, study support and transition to work programs across the entire educational sector. Programs have been developed to assist local people

enter into training and employment schemes, and include a variety of partnerships and collaborations with the Pilbara Technical and Further Education (TAFE) and the schools in the region such as:

- School-apprenticeship link program;
- School-based traineeship program;
- Pilbara Pathways Partnership;
- Roebourne Pathways program;
- Vocational training and work placement programs; and
- Fitness for work programs.

These programs will be consolidated with the appointment of a company Community Education Specialist who will have responsibility for the strategic management of these programs. A cadetship scheme and various scholarships provided by the company for school and university, provide individuals with access to the necessary support that they may require to complete their education and/or training.

Hamersley Iron sees significant benefit for the company as a consequence of its active involvement in the State education and national VET community. The company participates in many of the Pilbara education and training advisory boards to assist with the alignment of the training provision with skill requirements in the company's operations, whilst at the same time improving employment opportunities for the local community. Representatives from Hamersley Iron participate on the Board of Pilbara TAFE and have been instrumental in the establishment of the Pilbara Australian Technical College.

The company is acknowledged and well-respected as a significant stakeholder and a valuable contributor to the skills training agenda in the region.

4.6.2 Pilbara Iron Community Partnerships

The Pilbara Iron Community Partnerships programme is a $3 Million per annum initiative established by Rio Tinto to support Pilbara Iron in delivering on economic, environmental and social expectations for the period 2006-2008 inclusive.

Pilbara Iron Community Partnerships is a reputational vehicle that seeks to support the company's "licence to operate" through strategic partnerships that bring together combinations of industry, community, not-for-profit and government.

The funding distributed by Pilbara Iron Community Partnerships is complementary to all other existing funding that is distributed via other Pilbara Iron business units.

Programmes are developed under the partnership model, which sees agreement drawn up between all participating partners that documents expectations, outcomes, measures and management strategy.

The current Pilbara Iron Community Partnership Programme, where funding has already been committed (as of November 2006), is provided in (**Table 4-4)**.

- **Table 4-4 - Current Pilbara Iron Community Programmes**

Programme	Site	Committed Pilbara Iron Funding	Funding from other agencies
Turtle Monitoring	Coastal	$160k/3 yrs	CALM - $30k/3yrs Ningaloo Turtle Programme Cape Conservation Group Natural Heritage Trust MacMahon WWF
Lions Park upgrade	Inland	$52k	Pilbara Fund - $65k Ashburton Shire - $30k
Toy Library	Inland	$3k	Toy Library - $500k Lottery West - $3k
Lifeline	Coastal	$135k/3yrs	Woodside - $120k/3 yrs
Mentally Healthy WA	Coastal & Inland	$100k/2yrs	Health Way - $1.2m/2yrs WA Country Health - $700k/2yrs Lottery West - $200k/2yrs
Florence Exhibition	Coastal	$40k	Shire of Roebourne - $40k PDC - $40k Woodside - $40k
Shire of Roebourne Community Bus	Coastal	$10k	Shire of Roebourne - $10k
St John's Ambulance	Inland	$50k	St John's - $30k Community Fundraising - $20k
Scitech – Beijing Science Completion	Coastal & Inland	$30k/3yrs	Scitech - $30k/3yrs Education Dept - $30k/3yrs
Cossack Art Award	Coastal	$120k/3yrs	PI Principle Partner – numerous other contributors - $150k/3yrs
Pilbara Camp School – Firebugs	Coastal	$30k/3yrs	Woodside - $30k/3yrs Education Department - $10k/3 yrs
Leaping Lizards	Coastal & Inland	$250k/3 yrs	Telstra - $20k PDGP - $10k
Enterprise and Culture Centre	Tom Price	$30k	Purchase of Scout Hall for group
Medical Services Package	Coastal	In-kind support via	Woodside – supply of houses

Programme	Site	Committed Pilbara Iron Funding	Funding from other agencies
		the supply of houses for doctors	Burrup Fertilisers Dampier Salt Shire of Roebourne
Early Learning Specialist Scholarships	Coastal & Inland	$200k across all sites	Pilbara TAFE Shire of Roebourne Burrup Fertilisers
David Wirrpanda	Coastal & Inland	$800k/3 yrs	Woodside $600k/3 yrs Variety Club $20k plus a 12 seater bus
Vacation Child Care	Coastal	$20K	CSSU in-kind support
Indigenous Artist Development Workshop	Coastal	$50K	Artsource
Bio Diesel Production Training	Inland	$79K	Ashburton Aboriginal Corporation
Dampier Vacation and after School Care	Coastal	$45.5K	CSSU
Pannawonica Long Day Care	Coastal & Inland	$43K	CSSU
Student Placements	Coastal & Inland	$35K	Department of Sport and Recreation
Fisheries Volunteers	Coastal & Inland	$26.8K	Department of Fisheries
Rural Excellence in Nursing	Inland	$60K	Edith Cowan University
Home Safety Education Program	Coastal & Inland	$23.7K	Kidsafe WA
Pilbara Leaders Voyage Scholarships	Coastal & Inland	$25K	Leewin Ocean Adventure
Kids Matter Family Day Care Coastal	Coastal	$20K	PDC/Woodside
Support of Cultural Centre Upgrade	Inland	$130K	Tom Price Arts and Cultural Committee
TP Youth Support Association	Inland	$225K	Tom Price Youth Support Association
Tom Price School Chaplain	Inland	$24K	Tom Price Senior High School
Jim Piper Swim Clinics	Coastal & Inland	$32K	WA Aquatic Club
Football Development in WA	Coastal & Inland	$99K	WA Football Commission

4.6.3 Dampier and Karratha Community Services and Support

Hamersley Iron provides either complete or partial support for the following community services and community groups in Dampier:

- Dampier Fire and Rescue emergency service;

- Dampier Ambulance Service; including donation of an ambulance
- Dampier Health Services Hospital and Medical Centre; including provision of 10 accommodation dwellings within the Shire of Roebourne;
- Dampier Day Care Centre - upgrade and donation of a new facility;
- Karratha visitors centre;
- West Pilbara Sea Search and Rescue;
- Dampier Community Recycling station;
- Dampier playgroup
- Dampier playground, including provision of shade at two major public playgrounds
- Dampier sports playing fields ownership and maintenance, including partnership with Shire of Roebourne for major lighting upgrade;
- Dampier skate park, in partnership with Shire of Roebourne;
- Dampier Community Association building and financial support;
- Local schools;
- Numerous sports clubs and associations both direct funding and in-kind support (e.g. bus transport, accommodation);
- Dampier Camp School;
- Dampier Seafarers Centre; and
- Tidy towns initiative, with support for Dampier.

Community support has also been recently provided towards the following:

- Donation of anchor and provision of logistical support for Dampier entrance statement;
- Installation of barbecue and picnic facilities at Shark Cage Beach recreational area;
- PI Lifestyle Centre (Dampier Gym) – funding allocated, site to be determined;
- Sams Island - supporting the Sams Island Preservation Group and the Shire of Roebourne with significant financial and in-kind support for the restoration of historical buildings and gardens; and
- Financial and in-kind support for numerous local events and sporting/community groups.

4.6.4 Dampier Township Infrastructure

In addition to the community services and community groups supported by Hamersley Iron, a substantial number of township infrastructure items are either provided by, or supported by Hamersley Iron. These include:

- Dampier Catholic Church building;
- Dampier Seafarers centre building;

- Installation of various beachfront infrastructure (e.g.. shade, picnic table furniture)
- Town water supply reticulation;
- Town waste water and sewage collection and treatment;
- Partial road and drainage construction and maintenance in consultation with Shire of Roebourne;
- Dampier transit park leased to the Dampier Community Association;
- Dampier Community Hall; and
- Dampier library, in partnership with Shire of Roebourne.

Other things:

- Community advisory groups now set up at all sites to meet regularly and involve company, Shire and community representation;
- Local community donations administered by Pilbara Iron Community Liaison Officers;
- Pilbara Iron community recognition awards;
- Principal sponsors for 2006 FeNaCING Festival;
- Provision of medical services within Shire of Roebourne – focus on recruitment of medical practitioners, including provision of housing for doctors in Dampier, Karratha and Wickham;
- Day care – Dampier upgrades progressing;
- Installed 640 m of pedestrian footpaths in Dampier;
- Supporting after school and vocation care program in Dampier;
- Pilbara Iron partnering with Shire of Roebourne with Early Learning Specialist Scholarship Program to ensure child care staff numbers remain healthy;
- Housing – strategy being developed in consultation with local Government; and
- Coastal Times – replaced by 1 page monthly section in Pilbara News – called Unearthed.

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5. Existing Environment

A variety of specialist studies, including Aboriginal heritage, air quality, noise and marine and terrestrial flora were conducted to provide sufficient information for the assessment of environmental impacts for the Port upgrade to 95 Mtpa. The results of these surveys and other information describing the existing environment are provided in the Environmental Protection Statement (SKM 2005). The proposed increase in throughput to 145 Mtpa does not require any additional terrestrial disturbance or infrastructure requirements from that already in place or to be completed as part of the current upgrade. As such, only a summary of the existing environment is provided as an overview in **Table 5-1**.

- **Table 5-1 - Summary of the Local Environmental Characteristics of the Dampier Operations**

Aspect	Summary	Reference EPS (2005)
Physical		
Regional Setting	The Dampier operations are located on the Burrup Peninsula. The region is characterised by a rugged landscape, with extensive areas of rocky outcrops, scree slopes and steeply inclined drainage gullies. The area contains a rich concentration of Aboriginal rock art, particularly on the Burrup Peninsula, and has high tourism and recreation values. Major recreational activities include fishing, camping, swimming and walking. The region is supported by the Port of Dampier, where Dampier Salt, Hamersley Iron, the Dampier Port Authority and the North West Shelf Gas Project all have their own ship loading facilities.	5.2.1
Climate	The Burrup Peninsula and Dampier Archipelago have a tropical-arid climate comprising of two dominant seasons; a hot summer with erratic, heavy rainfalls from October to April, and a mild winter with occasional rains from May to September. The average annual temperature is 32.2°C, although temperatures can exceed 49°C in summer. The average annual rainfall is 261 mm (219 mm in 2004), and the average annual evaporation rate is 3,440 mm, exceeding rainfall by approximately 3,180 mm (Bureau of Meteorology, 2003).	5.2.2
Topography and Geomorphology	A survey by Astron (1996) of the Dampier Special Lease area identified several topographic landforms within the lease area. These included rocky outcrops, gently sloping scree slopes, incised drainage gullies, valley floors, coastal landforms (beach dunes and dunes) and low-lying saline flats.	5.23
Hydrogeology	Groundwater surrounding Dampier and the Burrup Peninsula is relatively restricted due to the nature of the existing geology. Very limited topsoil development underlain by Gidley Granophyre provides little opportunity for groundwater to be confined. Any groundwater recharge is generally lost. There are no known confined aquifers in the area.	5.2.4
Hydrology	No permanent or semi-permanent rock-pools are known to exist within the Dampier Special Lease area. Surface water drainage within the lease area is currently being managed by the existing operations.	5.2.5

Aspect	Summary	Reference EPS (2005)
Biophysical		
Vegetation	The Burrup Peninsula is part of the Eremaean Botanical Province, as defined by Beard (1975), and is characterised by open vegetation. Approximately 392 native vascular plant species have been identified on the Burrup Peninsula (Trudgen, 2002). No Declared Rare Flora (DRF) species have been recorded on the Burrup Peninsula (Aitkens, 2001). A Priority 1 species *Terminalia supranitifolia* was recorded in the survey area. Although much of the Dampier Special Lease area is previously disturbed, surveys by Astron (1996) and Joder and Thoma (2003) identified several major vegetation communities, according to landform and vegetation type, in the lease area: ■ Rocky outcrops/incised gullies; ■ Rocky slopes and wide valley floors; ■ Beach and dunes; and ■ Saline samphire flats.	5.3.1 – 5.3.3
Fauna	Surveys conducted on the Burrup Peninsula suggest that a total of 44 mammal (including introduced) species may inhabit the area (Anstee, 1996; Astron, 2002). Over 160 bird species from 53 families are likely to use the Burrup Peninsula, many of which are migratory species protected under the *Environment Protection and Biodiversity Act 1999* (Anstee, 1996; Astron, 2002). There are approximately 90 reptile species and other groups, such as legless lizards, dragon lizards, monitor lizards, frogs and blind snakes are also represented (Anstee, 1996; Astron, 2002). Three protected fauna species have previously been identified as having the potential to occur in the lease area. Two mammal species, *Petrogale lateralis* (Black-footed Rock Wallaby) and *Rhinonicteris aurantius* (Pilbara Leaf-nosed Bat) and one reptile species, *Morelia olivacea barroni* (Pilbara Olive Python).	5.3.4-5.3.5
Marine Habitat	Recent surveys of the coral reef habitats in the Dampier Port and inner Mermaid Sound recorded 120 species of scleractinian corals from 43 genera (Mscience 2005a). Five coral assemblages were distinguished on the basis of proportional differences in generic composition. Four of the assemblages were dominated by a single genus each: *Acropora* (particularly plate *Acropora*), *Porites*, *Pavona*, and *Turbinaria* respectively. The fifth assemblage was missed, consisting predominantly of faviids, *Turbinaria* and a variety of other scleractinian corals (Mscience 2005a). The distribution of coral assemblages appears to be correlated with water quality, wave energy and tidal currents. Coral assemblages adjacent to the Dampier townsite and along the western margin of the Burrup Peninsula consist predominantly of the mixed coral assemblage (MScience 2005a). Coral loss in the Dampier Port area is predominantly in the vicinity ship loading facilities at East Intercourse Island, Parker Point, the Dampier Cargo Wharf and the LNG wharves.	ARI 2006

Aspect	Summary	Reference EPS (2005)
Marine Fauna	Marine mammals recorded within Mermaid Sound are *Dugong (Dugong dugon*), Humpback Whale (*Megaptera novaehollandiae*), False Killer Whale (*Pseudorca crassidens*), Bottlenose Dolphin *(Tursiops truncatus*), Indo-Pacific Hump-backed Dolphin (*Sousa chinensis*) and Risso's Dolphin (*Crompids griseus)*. Four species of turtle known to nest in the Dampier Archipelago are the Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*), Flatback (*Natator depressus*) and Loggerhead (*Caretta caretta*). The Loggerhead Turtle is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. The Green, Hawkesbill and Flatback Turtles are listed as vulnerable. Twelve species of sea snake have also been found in the Dampier Archipelago, with the Olive Sea Snake (*Aipysurus laevis*) being the most common. Sixteen species of sea and shore birds are known to breed on the islands of the Dampier Archipelago.	5.3.6.2
Social		
Social -Dampier	The town of Dampier was established in 1966 by Hamersley Iron to accommodate employees and their families, and is now administered by the Shire of Roebourne. Dampier has an approximate population of 1,580 (ABS, 2001), but it is apparent that the population may have increased to approximately 2000 in 2006, however this cannot be verified until the 2006 census results are released. Dampier is a well established town with education and recreational facilities and is serviced by a small shopping centre. The local community often commute to Karratha on a weekly basis to meet any additional requirements.	5.4.2
European Heritage	Gravesites, shipwrecks and other historic buildings can be found on or near the Burrup Peninsula and Dampier Archipelago, although none are found within the Dampier Special Lease area.	5.4.3.1
Aboriginal Heritage	The Dampier region and Burrup Peninsula is considered to contain one of the world's largest concentrations of rock art. Surveys identified approximately 300 panels of rock art in the previous upgrade project areas, resulting in the identification of about 48 sites. The majority of the panels occur within the direct vicinity of granophyre rockpiles.	5.4.3.2
Recreation	The Pilbara coast, the Burrup Peninsula and Dampier Archipelago are used intensively for recreation by local residents. Tourism in the area is also becoming popular.	5.4.5

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6. Environmental Impacts and Management Strategies

6.1 Principles of Environmental Protection

In 2003 the *Environmental Protection Act 1986* was amended to include a core set of principles which are applied by the EPA in formal assessments. In the assessment of the environmental impacts associated with the project consideration has been given to the principles, contained in the EPA Position Statement No. 7 (Principles of Environmental Protection (EPA, 2004a). How these principles were considered with respect to the project is summarised below in **Table 6-1**.

Table 6-1 - How the various principles contained in the EPA's Position Statement No. 7 were considered with respect to the proposal to upgrade to 145 Mtpa.

Principle	Relevant	How the Project addresses the Principles
1. The precautionary principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by: (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and (b) an assessment of the risk – weighted consequences of various options.	Yes	Careful evaluation of the project has been undertaken to avoid, where practicable, serious or irreversible damage to the environment. Specialist studies (eg. flora, fauna, heritage, dust and noise) were undertaken at the site as part of the 95 Mtpa upgrade project to assess the environment and potential impacts, and management plans put in place to protect the environment. Additional noise and dust studies have been undertaken as part of the 120 Mtpa and 145 Mtpa throughput strategies. There will be no additional terrestrial disturbance from that completed as part of the 95 Mtpa and 120 Mtpa upgrades. The environmental risks associated with the increase in throughput have been assessed.
2. The principle of intergenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.	Yes	Sustainable development is a cornerstone of Hamersley Iron's business and underpins many of the plans and targets set within the company. Hamersly Iron's definition of sustainable development is based on the widely accepted Brundtland definition - "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs", and the company recognises that Sustainable development requires concerted collaborative effort from industry, governments, inter-governmental agencies and civil society.
3. The principle of the conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Yes	Conservation of biological diversity and ecological integrity is a fundamental consideration. Hamersley Iron's operations are required to address issues of biodiversity conservation. Baseline studies have been undertaken at the site to assess the environmental value of areas which could be impacted by operations and management plans implemented as required. As an example, a Marine Management Plan and Noise Management Plan have been developed. The increase in throughput to 145

Principle	Relevant	How the Project addresses the Principles
		Mtpa will not require any additional terrestrial disturbance.
4. Principles relating to improved valuation, pricing and incentive mechanisms a) Environmental factors should be included in the valuation of assets and services. (b) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance and abatement. (c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste. (d) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.	Yes	The full life cycle costs of mining iron ore, including the use of natural resources and assets and the ultimate disposal of any wastes and decommissioning and closure of operations is costed. Costs are provided for over the life of each operation on a unit of production basis. Hamersley Iron recognises the polluter pays principle, and has designed the Project to ensure that pollution type impacts are minimised. Hamersley Iron endeavours to only purchase goods where the full life cycle costs have been considered. Environmental goals will be pursued in the most cost effective way.
5. The principle of waste minimisation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	Yes	All reasonable and practicable measures are taken to minimise the generation of waste and its discharge into the environment. The preferred management options are to avoid, reduce, reuse, recycle and recover waste. Waste management at the Dampier Port operation is undertaken as outlined in the Pilbara Iron Waste Management Plan under an ISO14001 framework through the 'Iron Environmental Management System'.

6.2 Environmental Management

Hamersley Iron aims to conduct its business in an efficient and environmentally responsible manner that is compatible with the expectations of its shareholders, government and the community. Hamersley Iron also recognises that environmental responsibilities go beyond those required under statutory regulations, with these encompassing social obligations, leadership in sustainable development and minimising environmental impacts.

Hamersley Iron operates under an ISO14001 framework through the 'Iron Environmental Management System' (IEMS). ISO14001 is an internationally recognised continuous improvement model that has been implemented by organisations worldwide. Its basis lies in management commitment and the allocation of resources to establish systems based on reducing environmental risk. The key elements of ISO14001 include assessing environmental risk and legal requirements,

developing objectives and targets for improvement, training, operational control, communication, emergency response, corrective actions, audits and review. Rio Tinto mandated that all its global operations be certified to this standard by July 2005. Certification to ISO14001 at Dampier was originally achieved in 2003, and the most recent re-certification was obtained in 2006.

The Pilbara Iron and Robe River Joint Venture and Rio Tinto Iron Ore Expansion Projects Environmental Policy (see copy below) was signed in February 2006 by the Managing Directors of Pilbara Iron, Expansion Projects and Robe River Joint Venture and the Chief Operating Officer of the Pilbara Rail Company. The Environmental Policy is the guiding document for driving environmental management and provides context and specific direction for continuous improvement.

Pilbara Iron and Expansion Projects are members of the Rio Tinto Group operating in the northwest of Western Australia, headquartered centrally in Perth.

Pilbara Iron is a world-class asset manager operating and maintaining one of the largest mining, rail and export facilities on behalf of asset owners, Hamersley Iron and Robe River Iron Associates. Through an expanding network of nine mines, three ports and the largest privately owned railway in the world, Pilbara Iron handles more than 170 million tonnes of iron ore annually.

Expansion Projects is committed to delivering world-class projects in line with market demand. Expansion Projects evaluates opportunities for additional mine developments and conducts pre-feasabillity and feasibility studies leading to the final phases of construction and commissioning of numerous projects. These projects are designed and constructed to operate in a way that adds value whilst minimising environmental impact.

Dave Smith
Managing Director
Pilbara Iron

Jack Sato
Managing Director
Robe River

Warwick Smith
Managing Director
Expansion Projects

PILBARA IRON & ROBE RIVER JOINT VENTURE + EXPANSION PROJECTS

ENVIRONMENTAL POLICY

AIMS

- efficient use of natural resources
- meet our legal and voluntary obligations including Standards and Policies set by Rio Tinto
- prevent pollution with the aim to minimise, mitigate and remediate environmental incidents in an efficient manner
- leave areas as close as practicable to how we found them
- continually improve our performance
- employees and contractors know their environmental accountabilities and act on them
- proactive approach to understanding preliminary and cumulative impacts of our operations
- provide opportunities for communities and others to tell us what they think
- manage our water resources in a responsible manner that takes account of social, cultural, environmental and economic values

ACTIONS

- manage our environmental issues through our business systems
- develop environmental improvement plans each year for priorities identified in review of systems and performance
- improve the ability to measure water use, energy use and greenhouse gas emissions
- minimise waste and spills to the environment
- improve the efficiency of our use of natural resources
- meet our Sustainable Development targets by reducing emissions to the environment, minimising land disturbance and having a net positive impact on biodiversity
- update plans for disturbance and closure, progressively rehabilitate and measure success
- ensure compliance with the Rio Tinto Iron Ore Ground Disturbance approvals process
- recognise good environmental performance
- train staff and contractors in environmental requirements of their work
- community views are sought, respected and considered
- improve our water use efficiency and engage with water users to encourage the sustainable use of water
- report regularly to stakeholders on our performance

FEBRUARY 2006

PROTECT | RESTORE | DO IT BETTER

Iron Environmental Management System

Pilbara Iron

ROBE

Sustainable Development

Expansion Projects

6.3 Relevant Environmental Factors

The significant environmental issues relating to the Dampier Port Upgrade Project, and the environmental factors associated with these issues, were identified utilising EPA guidelines and preliminary stakeholder consultation.

A summary of the potential environmental issues and environmental factors are given below:

- Air Quality – Dust;
- Noise;
- Water Management;
- Marine Environment.; and
- Greenhouse Gases.

The following **Sections 6.5–6.9** present a detailed discussion of the potential environmental impacts and management strategies for each environmental factor. The EPA has prepared a list of generic environmental factors and associated environmental objectives in the 'Guide to EIA Environmental Principles Factors and Objectives' (EPA, 2004b). Where objectives and environmental factors have not been described by the EPA, Hamersley Iron has provided its own objective to ensure that the relevant environmental factor is managed appropriately.

6.4 Minor Environmental Factors Not Further Assessed

A number of environmental factors have not been addressed in detail as they are considered to be minor factors given the nature of the proposal to increase throughput to 145 Mtpa, the location of the planned activities and the extent of existing management measures that are already in place. These factors are waste, drainage and heritage. These factors are addressed briefly below in **Sections 6.4.1-6.4.3**.

6.4.1 Waste

Following the increase in throughput, the volume and types of waste produced will not change from those generated by the existing Dampier operation and which are currently managed under the Iron Environmental Management System (IEMS).

6.4.2 Drainage

The potential impact on surface hydrology associated with the increased throughput will be contamination of surface and marine waters by sediment discharge from the additional ore handling. Surface water drainage under the implementation of the increased throughput will be controlled using existing structures in place at Dampier.

The project incorporates three water holding basins (refer to **Figure 3.4**) which were constructed as part of the 95 Mtpa upgrade at Parker Point, namely:

- A sediment Basin in the Eastern Stockyard;
- A Western basin; and

- A Parker Point Consolidated Siltation Pit and associated water recycling (for plant dust scrubber for the existing car dumper and screen house)

The eastern and western basins are designed for a 1:5 year event, with a weir and a slow release underflow system. Water captured in the sediment basins will be available for dust control purposes for some periods of the year (through the application onto roads from water trucks). The Parker Point Consolidated Siltation Pit allows treated water (sediment removed) to be pumped to a process water tank for use in dust control mostly through onsite water canons. This will alleviate some demand on the Water Corporation supply. Drainage and water collection structures are properly maintained during operation; and the existing water quality monitoring program will be extended to incorporate the increase in throughput and to ensure stormwater discharge from the Parker Point area is within guideline limits.

6.4.3 Heritage

The Burrup Peninsula is well known for the large collection of rock etchings. It is estimated that the rock art of the Burrup Peninsula has more than 10,000 engravings with over 500 sites that have been officially recorded (DoIR, 2006).

The increase in throughput to 145 Mtpa will not result in the disturbance of any known heritage sites, as there will be no additional clearing and the disturbance footprint will remain the same. However, as there are rock etchings adjacent to the operations, especially in the southern Burrup Peninsula, there has been some concern that the etchings could be affected by emissions from industry in the wider area, including Parker Point (CSIRO, 2005).

As an input to the long-term management of the cultural and natural features of the Burrup Peninsula, the Western Australian Government (with financial support from Pilbara Iron and other industries) commissioned a monitoring program to assess whether there was any change to the rock engravings over and above that due to natural weathering (DoIR, 2006). The study is focused on gaseous chemical emissions, but also investigates particulate concentrations and dust deposition at several sites in the area (CSIRO, 2005). The study includes measurements of gas, particulate and rainwater chemistry at seven sites on the Burrup Peninsula, and at two adjacent sites at Karratha and Mardie Station.

The gas concentrations presented in results released so far, show that in all cases concentrations are very low compared to polluted urban areas. Preliminary results indicate enhanced levels of PM_{10}, TSP and surface dust deposition in the lower Burrup, where the majority of industrial operations are located, when compared with the background levels recorded further north on the Peninsula (CSIRO, 2005). There is a potential for hematite contained within iron ore dust to obscure the rock art images, created by removing the rock patina which also contains hematite and is of a similar colour to iron ore dust. Regional studies are currently underway investigating the effects of depositional dust on rock art images.

The study being undertaken by the CSIRO commenced in 2004 and results released to date are only based on data obtained between July 2004 and February 2005 with monitoring scheduled over a four year period.

There are a number of large and very significant rock art complexes in the general vicinity of the Hamersley Iron Parker Point operations that could be impacted by emissions of iron ore dust. However, the composition of the iron ore dust and the rock surfaces involved make it highly unlikely that iron ore dust would cause any chemical reaction that could adversely impact on the rock art or associated rock surfaces.

The iron ore dust could, however, have the potential to build up on the rock surfaces and for some of it to be accreted to the natural surface layer of the rock in a way that, over time, could lead to a lowering of the colour contrast between the dark natural surface of the rocks and the much lighter engraved areas of more recent engravings.

Observations show that engravings do naturally develop a surface patina that, over time, results in a loss of colour contrast. Any increased levels of iron in dust falling on the engravings would, at worst, have a very small incremental impact on this natural process, which in any case appears to take 100s of years to significantly alter the colour contrast.

Dust dispersion modelling indicates that there will be small increases in amounts of iron oxide in the dust deposited at a number of rock art sites that can be attributed to Hamersley Iron's operations. The increase is strongly influenced by the prevailing wind and deposition rates are greater for sites to the east-north-east of the facilities.

Analysis of dust samples shows that iron ore dust is only making a small contribution to the total dust load and that it is rapidly diluted as the distance from the source increases.

Observations at the major rock art sites show no evidence for any long term accretion of iron ore dust to the rock surfaces (Wanati 2003). Likewise, examination of engravings in areas close to iron ore handling facilities, with significant iron ore dust deposition, show no long term accretion effects that are altering the colour contrast between engraved areas and the rock surfaces.

The only published results of colour monitoring indicate that there has been an overall loss of iron oxide from the rock surfaces resulting in lighter coloured rock surfaces. This is the opposite effect to that which would be occurring if there was any increase in the accretion of iron ore dust to the rock surface.

Although there is no scientific evidence to support assertions that industrial emissions are impacting on rock art, the State Government established the Burrup Rock Art Monitoring Committee with a four year brief to investigate the potential and to recommend management

procedures to minimise any impacts found. Pilbara Iron provided around $175,000 toward the initial rock art monitoring study. The rock art monitoring program monitored various sites along the Burrup Peninsula (including immediately adjacent to Parker Point – site 8) and was undertaken by CSIRO and was co-ordinated through DoIR on behalf of Rock Art committee and steering groups. This program included 12 months of air quality monitoring to establish baseline information. It has indicated that air quality on the Burrup is very good with minimal organic compounds detected in most locations. Industrial dust was noted as an issue in sites close to known industrial sites. These results were the subject of a press release and the details are on the DoIR website. Other rock art characterisation work is ongoing. Pilbara Iron has recently committed to contribute further funding of $200,000 toward the extended rock art monitoring program over the next three years. The outcome of this continuing study will ultimately be made publicly available through the DoIR website.

Management strategies to reduce dust generation from the operations have been described in full in the Dust Management Plan, and summarised in **Section 6.5.5**.

6.5 Dust and Particulates

6.5.1 Management Objective

To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of peoples and land uses by meeting statutory requirements and acceptable standards.

6.5.2 Potential Health Impacts of Ambient Iron Ore Dust

It is recognised that there are potential health hazards associated with inhalation of airborne dust. These risks are related to the concentration, particle size, and constituents of the dust.

The size of particles is directly linked to their potential for causing health effects. Small particles pose the greatest problems because they can get deep into the lungs and very small particles may even get into the bloodstream. Small particles include both fine particles, such as those found in smoke and haze, and coarse particles, such as those found in wind-blown dust. Exposure to larger particles (>10 μm) is of less concern, although they can irritate eyes, nose and throat.

Fine and coarse particles can build up in the respiratory system and excessive levels are linked to numerous health effects such as asthma, decreased lung function, and, in severe cases, premature death. Senior, children and people with heart or lung disease appear to be at greatest risk.

Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with reduced lung function and chronic bronchitis. Short-term exposure, for hours or days, can result in asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. Healthy adults and children have not been reported

to suffer serious effects from short-term exposure, although they may experience temporary minor irritation when particle levels are high.

Almost all epidemiological studies of the health effects of particulate matter have been conducted in urban areas, which are impacted by particulate matter that is likely to be quite different in size distribution and particularly composition to the particulate matter impacting a semi-arid rural environment such as the Pilbara. Regional areas in Western Australia typically have smaller population centres and dry, windy environments with fugitive dust being characterised by coarser crustal particulates (>2.5 μm diameter). Characterisation of airborne dust in the town of Dampier has confirmed that it is primarily of mineral origin. The particle sizing is strongly consistent indicating the particulate is only from mechanical processes and totally different to city particulate. City particulate is at least an order of magnitude smaller than the dust at Dampier and consists of condensate and combustion particulate.

The extent to which epidemiological data can be extrapolated from urban environments to the Pilbara is uncertain and is the subject of a review currently being conducted by the Department of Health (DoH). The review which is in three parts will help determine health implications of the current dust levels, if any, and enable the development of an appropriate health standard for the Pilbara region.

The first part of the study which is a review of international studies into the health impacts of crustal particles, will look at particles overall and also the specific types of dust found in Port Hedland. The second part of the DoH review (morbidity study) will look at ten years of records of Port Hedland people hospitalised with respiratory and cardiovascular disease to identify if there is evidence that areas of higher dust concentrations result in higher rates of hospitalisation for respiratory disease. The final part of the review will examine whether lung and other cells are damaged or stimulated by components of the dust in Port Hedland compared to similar particulate levels in dust from a city (Perth). This study will answer the question about whether the Port Hedland dust is less toxic to cells than dust from urban areas. Although the review is focused on Port Hedland, which not only exports iron ore, but also small quantities of salt, manganese, feldspar and copper concentrate, results will also be relevant to other iron ore export facilities in the Pilbara region.

The draft document providing the preliminary findings of the literature search has recently been released for review and is summarised in the following sections.

Composition of Particulate Matter

The composition of particulate matter is influenced by geographical, meteorological and anthropogenic factors, including the degree of urbanisation, industrial and agricultural activities, and the type and volume of vehicular traffic. The major components of airborne particulate matter

are sulphate, nitrate, chloride, elemental and organic carbon, crustal material and biological material. In dry climates crustal material may be an important component of particulate matter, while in urban areas SO_2, NO_2 and organic and elemental carbon, derived from fossil fuel combustion and motor vehicle exhausts, are major components of particulate matter.

Health effects of exposure to crustal dust

The literature review indicated that average airborne quartz concentrations < 50 μg/m^3 are unlikely to be associated with the risk of developing silicosis. Potentially disabling silicosis occurs only with exposure to concentrations of 200 – 500 μg/m^3, over prolonged periods.

There is evidence that sufficient exposure to iron ore dust can cause pneumoconiosis. However this is likely to be primarily due to the quartz component, and iron oxide at concentrations to which workers/miners have been exposed, is relatively non-toxic in this respect. Iron oxide may also possibly be carcinogenic, but excesses of lung cancer in the mining industry are more likely to have been due to irradiation from radon underground.

Effects of urban particulate matter on cardiorespiratory health

Studies conducted at different urban locations worldwide indicate an association between ambient particulate matter and mortality. In some locations there is evidence for an independent effect of coarse particulate matter on short-term mortality, although many studies that have examined the effects of crustal or windblown particles have not identified a significant association with mortality. There is also little or no evidence that long-term exposure to coarse particulate matter is related to increased mortality. In urban areas, there is stronger evidence that exposure to fine particulate matter derived from anthropogenic sources, including fossil fuel combustion and industrial sources, might be associated with increased short-term mortality. Long-term exposure to fine particulate matter also appears to be associated with increased mortality.

Fine particulate matter appears to have a stronger and more consistent association with reduction in lung function than coarse particulate matter. Many studies have shown significant associations between exposure to coarse particulate matter and the incidence of respiratory symptoms, chronic bronchitis and cough among asthmatic children.

There is now a substantial body of evidence linking exposure to ambient particulate matter with cardiovascular disease. Exposure to fine particulate matter increases the risk for cardiovascular mortality by inducing pulmonary and systematic inflammation, accelerating atherosclerosis and altering cardiac autonomic function. Increases in the levels of ambient particulate matter have also been found to be associated with increases in blood pressure, plasma viscosity and serum C-reactive protein among healthy subjects and with decreased endothelial dilation in subjects with diabetes.

Almost all epidemiological studies of the health effects of particulate matter have been conducted in urban areas, which are impacted by particulate matter that is likely to be quite different in size distribution and particularly composition to the particulate matter impacting a semi-rural environment such as Port Hedland and Dampier.

However, the limited epidemiological data that is available, does not suggest that iron plays an important role in giving rise to the health effects attributed to PM_{10}.

Other potential morbidities associated with particulate matter exposure relevant to Port Hedland

Exposure to dust comprising particles between 1 and 50 μm in diameter may result in so-called nuisance effects, including minor or self-limiting irritation of the eyes, upper respiratory tract and/or skin. Iron oxides within such nuisance dust may cause irritation of the eyes, nose and upper respiratory tract.

Although haematite (iron oxide) mining is variably associated with excess risk of lung cancer, the available epidemiological data generally do not strongly support a causal relation between exposure to haematite dust and carcinogenesis. The heightened cancer risk can probably be attributed to concomitant exposure to radioactivity.

Study recommendations

From the available information, the literature review determined that regulation of exposure to Port Hedland dust should be analogous to that for a mixed mineral dust such as coal, adjusted to take account of duration of exposure over a lifetime, and of the presence in the population of relatively vulnerable young and disabled people.

The review also indicated that there is no reason to expect that the adverse health effects of the dust generated from urban sources would be similar to that associated with the different sources found in Port Hedland. Furthermore, the review stated that there is no justification for NEPM, which has been developed for urban environments, to be uncritically applied to Port Hedland. Consequently, it was recommended that the control of air pollution in Port Hedland be achieved by imposing an annual Air Quality Standard and additionally a daily average limit. The recommendation was for:

- annual average less than 100 $\mu g/m^3$, with
- a daily average limit <200 $\mu g/m^3$.

6.5.3 Ambient Air Quality

6.5.3.1 Ambient Air Quality Criteria

Dust is generally assumed to comprise of fine, airborne particles of earth or pollen material. Monitors used to measure dust may also include in their measurement smoke particles, salt and other aerosols suspended in the air.

Dust or particle monitors have a cut-off for the size range of the particles they collect and measure. Three size ranges commonly used are 50 μm, 10 μm and 2.5 μm. The particulate matter (PM) measured is abbreviated as PM_{50}, PM_{10} and $PM_{2.5}$, respectively. PM_{50} is also referred to as Total Suspended Particulates (TSP).

The NEPM Standard values for particulate aim to protect people's health and well-being, through the means of a nationally acceptable ambient standard. They are designed to protect those who are most susceptible to experiencing health effects when particulate matter is inhaled.

Environmental criteria for dust used in Western Australia are outlined in **Table 6-2**.

- **Table 6-2 Criteria for Airborne Dust used for Residential Areas in Western Australia.**

Particle Size	Averaging Time	Concentration (μg/m^3)	Frequency	Reference
TSP	15 minutes	1,000	Not to be exceeded	KEPP, Area C (residential)(1)
	24 hours	90	Desirable not to be exceeded	
	24 hours	150	Not to be exceeded	
PM_{10}	24 hours	50	Not more than 5 days per year	
$PM_{2.5}$	24 hours	25	Goal is to gather sufficient data nationally to facilitate a review of the Advisory Reporting Standards as part of the review of the Measures scheduled to commence in 2005	NEPM for Ambient Air(2)
	1 year	8		
Deposition	30 days	2 g/m^2/month	Guideline	DEC NSW (2005)(3)

Notes:

1) Environmental Protection (Kwinana) (Atmospheric Waste) Policy 1992 and Environmental Protection (Kwinana) (Atmospheric Waste) Regulations 1992.

2) National Environment Protection Council (NEPC), 1998, National Environment Protection Measure for Ambient Air Quality, 26 June 1998 and Variation dated 23 May 2003.

3) Additional insoluble deposited dust assuming a background level of 2 g/m2/month

The NEPM standards were derived from health studies in major urban centres where the particulate matter was comprised primarily of combustion products from vehicles, industry and smoke from various burning activities. It is generally recognised that these standards are not applicable to crustal material or material such as sea salt.

Consequently, in terms of implementing the NEPM in Western Australia, the DEC has stated that:

It is proposed to implement the NEPM via a state-wide Environmental Protection Policy (EPP) which:

- *references the NEPM standards for general application in WA, but also;*
- *excludes application of the standards within industrial areas and residence-free buffer areas around industrial estates;*
- *for circumstances where the standards are not being achieved due to existing emissions, enables attainment and/or management programs to be established. (The NEPM goal envisages a 10 year period for attainment).*

Examples of issues which would need to be addressed via attainment and/or management programs are as follows ….

- *Exceedences of dust standards in the Pilbara (often caused by natural events) are inevitable. Good dust management practices can form the basis for acceptable management programs for Pilbara industries.* ..(NEPC 1997).

The above criteria for TSP and PM_{10} have been reflected in the performance targets in Hamersley Iron's Dust Management Plan (DMP) for its Dampier operations. The DMP contains the following performance targets for PM_{10} and TSP:

- Zero PM_{10} exceedences of 50 $\mu g/m^3$ over a 24-hour period as measured at the Dampier Primary School monitoring station, where there is a significant contribution by Hamersley Iron's operations. and
- Zero TSP exceedences of 90 $\mu g/m^3$ over a 24-hour period as measured at the Dampier Primary School monitoring station, where there is a significant contribution by Hamersley Iron's operations.

The basis of the PM_{10} target is the National Environment Protection Council's PM_{10} standard of 50 $\mu g/m^3$, 24-hour average. The standard has a goal of no more than five exceedences per year of this concentration. It is understood that the DEC recognise that background levels of PM_{10} in the Pilbara can contribute substantially to measured concentrations, and that this needs to be considered in the application of the NEPM standard to the control of emissions from industrial sources in the region. The procedure for determining Hamersley Iron's contribution is based primarily on the analysis of the 10-minute average PM_{10}, wind direction and wind speed data over each 24-hour period, measured at the Dampier Primary School.

The basis of the TSP target is the Kwinana Environmental Protection Policy (KEPP) residential standard for TSP of 90 $\mu g/m^3$. This is the only legislated TSP standard in Western Australia. The KEPP refers to the 90 $\mu g/m^3$ level as "desirable not to exceed" in residential areas.

The KEPP also refers to a TSP limit of 150 μg/m^3 which is not to be exceeded in residential areas, therefore the use of 90 μg/m^3 as the basis of a performance target implies some conservatism.

As for PM_{10}, background levels of TSP contribute to ambient measurements. Therefore, Hamersley Iron's TSP performance target is related to the level of contribution by the Company's operations. The procedure for determining Hamersley Iron's contribution is based primarily on the analysis of the 10-minute average TSP, wind direction and wind speed data over each 24-hour period, measured at the Dampier Primary School.

Hamersley Iron does not have a performance target for $PM_{2.5}$. Hamersley Iron is currently conducting concurrent monitoring of $PM_{2.5}$ at Karratha and at the Dampier Primary School.

6.5.3.2 Dust and Meteorological Monitoring Program

Hamersley Iron has undertaken dust monitoring in the Dampier region since 1993. The number, types and locations of the monitors have varied over the years in response to changing demands and circumstances. There are numerous constraints which restrict the ability to monitor in any desired location which include, for example, site ownership and access, security, noise impacts, the availability of power and the proximity of nearby potential sources of dust that could cause measurements to be unrepresentative of the locality in general. The broad objectives of the monitoring program are to:

- Determine long term trends in ambient dust levels;
- Determine TSP and PM_{10} concentrations at representative locations within Dampier for comparison to criteria levels;
- Determine the most appropriate options for dust control improvement projects;
- Determine PM_{10} concentrations at a nearby town (Karratha) that will have negligible impacts from Dampier operations and therefore be representative of a typical Pilbara town;
- Provide scientific data to the community.

Details of Hamersley Iron's existing dust monitoring network are presented in **Table 6-3**.

- **Table 6-3 Dust Monitoring in the Dampier and Karratha Region.**

Site Name	Location – GDA94 (m)		Parameter	Monitor	Period	Comments
	E	N				
Dampier Primary School	469348	7715001	PM_{10}	TEOM	13/04/2000 to current	Ambient measurement in sensitive environment
			PM_{10}	E-BAM	13/06/2004 to 17/06/2005	
			TSP	TEOM	23/02/2002 to current	
			$PM_{2.5}$	TEOM	24/10/2005 to current	
			Met data (10 m)	Various	24/02/1998 to current	
Parker Point – north of main administration building (AB)	471544	7716333	PM_{10}	E-BAM	03/06/03 to 05/12/2005	Ambient measurement with focus on Parker Point sources (Decommissioned as was in unsealed car park)
East Intercourse Island – boat jetty near marine workshop (BJ)	468280	7713964	PM_{10}	E-BAM	03/06/03 to current	Ambient measurement with focus on EII and 5E sources
Parker Point – SKM offices	471596	7716659	Met Data (4.5 m)	Oregon Scientific WMR-968	26/08/2005 to current	Installed to assist management of dust from construction activities
East Intercourse Island	466527	7715879	TSP	High Volume Sampler	03/10/1993 to 16/02/2003	Occupational Health
Karratha Water Corp Pump station	485417	7708000	TSP	High Volume Sampler	04/05/1996 to 16/02/2003	Ambient measurement
			PM_{10}	TEOM	22/02/2002 to current	
			$PM_{2.5}$	TEOM	01/09/2005 to current	
			Met Data (5 m)	Various	22/02/2002 to current	

Site Name	Location – GDA94 (m)		Parameter	Monitor	Period	Comments
	E	N				
King Bay	473525	7719352	PM_{10}	E-BAM	26/08/2005 to current	Ambient measurements with focus on Parker Point operations contribution to King Bay

E-BAM continuous PM_{10} dust monitors were installed at the East Intercourse Island Marine Workshop near the water-front, just north of where the 5E conveyor reaches the mainland, and at the Parker Point Administration Building (AB) in mid-2003. The locations of these were selected on the basis of being at the "coal-face" between the Hamersley Iron operational areas and the Dampier township.

An E-BAM continuous PM_{10} monitor was installed in August 2005 on the Dampier Port Authority site in King Bay, immediately behind the rock wall. This location was selected to enable the dust contributions in the King Bay area from the Parker Point operational area to be determined, in view of the potential for expanding iron ore throughput at Parker Point.

The measurement of $PM_{2.5}$ also commenced in October 2005 at the Dampier Primary School site and in September 2005 at the Karratha site. The same type of monitor (TEOMs) was used to ensure comparability of the data.

Wind data used to assist the interpretation of ambient dust levels at Dampier are sourced from the Dampier Primary School anemometer. This anemometer has been subject to a full compliance assessment (Environmental Alliance 2004). The compliance assessment found that the anemometer was suitable for wind measurements in the Pilbara environment for the purpose of dust impact assessment.

Data collected up to 31 December 2006 have been used for the purpose of this report.

6.5.3.3 Ambient Dust Concentrations

Annual average concentrations of airborne particles at monitoring sites in the Dampier/Karratha region are shown in **Table 6-4** and summarised below.

Dampier Primary School and Karratha PM_{10}

The monitoring at the Karratha site which is unaffected by dust from Hamersley Iron's operations at Dampier is intended to provide comparative data against the Dampier Primary School measurements where Hamersley Iron's dust does contribute.

Up until 2006, the Karratha monitoring site was probably influenced by dust emissions from vacant land to the west and north. The land to the west has since been redeveloped for housing however, there the bare land to the north remains. On one hand, these data could be interpreted as representative of background dust levels since there is nothing unique about vacant land in the Pilbara. Airborne particle levels in mid-suburban areas where the surrounding land has been more stabilised could, however, be lower – assuming no localised influences from nearby vehicles, unpaved driveways or similar sources.

The Karratha data indicates that that year-to-year variability can be substantial due to both climatic variability and the nature of surrounding urban activity.

For 2003, the annual average PM_{10} measured at Karratha was 40% higher than measured at Dampier. This seems to have been something of an aberration. For all of the other years, the annual average PM_{10} measured at Karratha was within ±10% of that measured at Dampier.

Dampier Primary School and Karratha $PM_{2.5}$

Over the first full year of monitoring – 2006, the $PM_{2.5}$ concentration at the Dampier Primary School was 3.1 $\mu g/m^3$ which was lower than the 4.3 $\mu g/m^3$ measured at the Karratha monitor. Both of these are well below the NEPM Advisory Reporting Standard of 8.0 $\mu g/m^3$.

Trends from 2006 Measurements

For 2006 at the Dampier Primary School:

- The average PM_{10} concentration of 21.2 $\mu g/m^3$ was about 9% less than the 2001 to 2005 average of 22.8 $\mu g/m^3$.
- The average TSP concentration of 27.9 $\mu g/m^3$ was about 11% less than the 2003 to 2005 average of 30.6 $\mu g/m^3$.

This indicates that dust levels at the Dampier Primary School over 2006 were lower than the "long term" average. At Karratha however, the average PM_{10} concentration of 19.3 $\mu g/m^3$ was about 25% less than the 2003 to 2005 average of 25.6 $\mu g/m^3$. Changes in the nature of land uses around the monitors probably have an influence – for example, the paving of the car park adjacent to the Dampier Primary School monitor in 2005 and the stabilisation of land west of the Karratha monitor for housing development. Therefore the reduction in the 2006 dust levels at Dampier and Karratha may have been assisted by these changes along with possibly lower naturally-occurring levels than previously.

The data recovery at the Boat Jetty and Admin Building sites for 2006 was too poor to enable a meaning assessment of dust trends.

■ **Table 6-4 - Annual average concentrations of airborne particles at Hamersley Iron monitoring sites in the Dampier region.**

Year	Annual Average Concentration (μg/m^3)							
	Residential Locations					Non-Residential Locations		
	Dampier Primary School			Karratha		Boat Jetty	Admin Building	King Bay
	$PM_{2.5}$	PM_{10}	TSP	$PM_{2.5}$	PM_{10}	PM_{10}	PM_{10}	PM_{10}
2002		25.8	32.3[a]		24.3[b]			
2003		24.4	31.9		34.6	26.3[c]	25.7[d]	
2004		20.6	30.4		19.4	29.8	31.3	
2005	7.6	22.3	29.4	4.6[f]	22.7	27.1	24.6	23.1[e]
2006	3.1	21.2	27.9	4.3	19.3	23.7	15.2	20.0

Notes:

a) 01/03/2002 to 31/12/2002, b) 01/06/2002 to 31/12/2002, c) 04/06/2003 to 31/12/2003
d) 28/10/2005 to 31/12/2005, e) 27/08/2005 to 31/12/2005, f) 01/09/2005 to 31/12/2005

Table 6-5 provides a summary of average dust levels measured at other Pilbara sites which are indicative of background dust levels in the Pilbara. The monitoring data from Boodarie (DoE 2004) (19.5 μg/m^3) should be indicative of background dust levels in the Pilbara. The 2001 – 2006 average PM_{10} concentration measured at the Dampier Primary School site of 22.6 μg/m^3 is 15% above Boodarie.

■ **Table 6-5 - Long term average dust levels at Dampier compared to other Pilbara sites, largely unaffected by ore handling.**

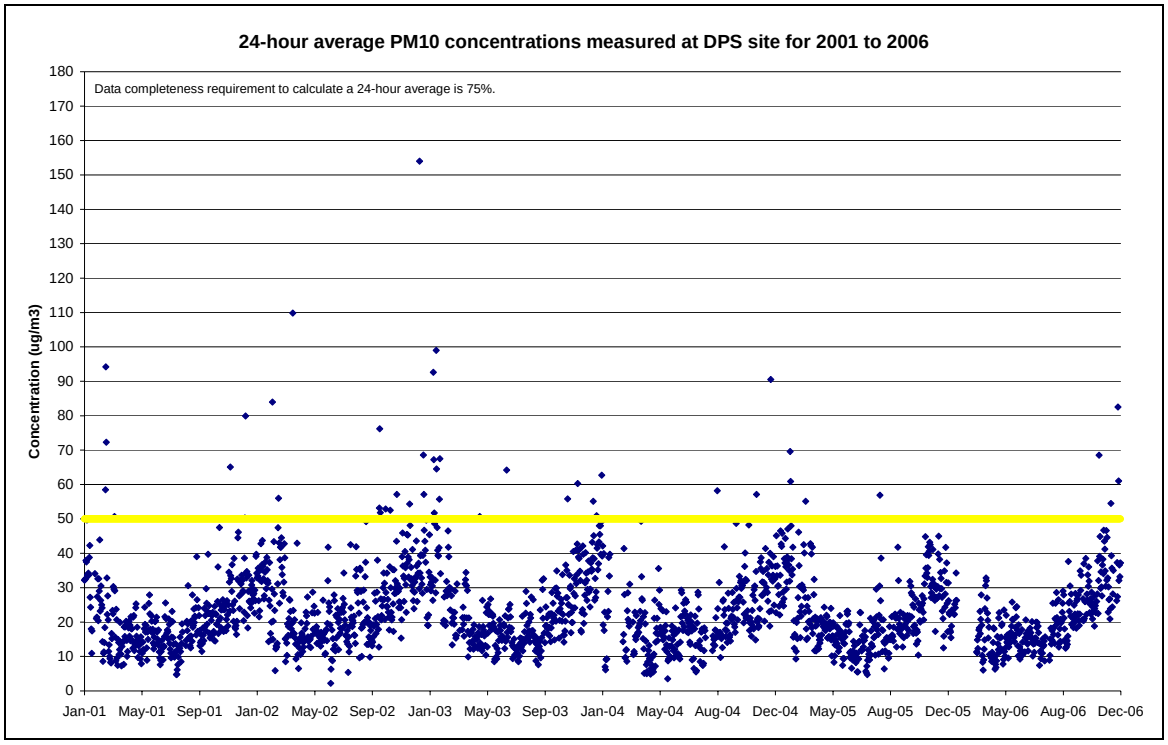
Site	Period of Data	PM_{10} Concentration (μg/m^3)
Boodarie [a]	1998 to 2000	19.5
Cape Lambert[b]	2001	22.0
	2002	22.2
	2003	21.6
	2004	21.2

Notes:

a) DoE 2004 "Pilbara Air Quality Study Summary Report", Technical Series Report No 120, August 2004.

b) Monitor is located south-east of Robe River iron ore outloading operations at Cape Lambert – about 50 km east of Dampier. The average PM_{10} concentration is for winds with the 0-290° arc which should be unaffected by the local ore handling operations.

Health-related dust impact criteria are mostly based on 24-hour averages. **Figure 6.1** shows the daily (24-hour) average PM_{10} concentrations measured at Dampier Primary School for 2001 to 2006. The NEPM goal of 50 μg/m^3 is also shown (yellow line). The PM_{10} goal allows five exceedences per year.



- **Figure 6.1 - 24-hour PM_{10} concentrations measured at Dampier Primary School site for 2001 to December 2006.**

6.5.4 Dust Arising from Operating at 145 Mtpa

In combination with naturally occurring dust levels, the operations at both Parker Point and East Intercourse Island generate dust that has the potential to impact on the local environment and cause community concerns within Dampier. In order to predict Hamersley Iron's contribution to ambient dust levels within Dampier due to the proposed increase in throughput, Environmental Alliances was commissioned to develop a numerical dust model based on the CALPUFF dispersion model.

The CALPUFF air dispersion modelling system was selected to predict dust impacts from the proposed throughput increase to 145 Mtpa due to its ability to model complex meteorological flow conditions where steady-state straight-line assumptions are inappropriate. The trajectories of dust emissions from Hamersley Iron's Dampier Ports follow highly varying combinations of over-water and over-land paths. For example, dust dispersion from East Intercourse Island to Dampier and Parker Point to King Bay are almost entirely over water. Conversely, advection from Parker Point to Dampier is completely over land. Advection from East Intercourse Island and Parker Point to other areas of the Burrup Peninsula may be partly over water and partly over land. The AUSPLUME Gaussian dispersion model used previously (for the upgrade to 95 Mtpa and the

upgrade to 120 Mtpa) can only handle uniform domains and cannot account for the variations in dispersion that result from different trajectory characteristics.

The prediction of dust impacts for the proposed increase in throughput to 145 Mtpa were made by estimating the changes to dust emissions compared to operations at 95 Mtpa, then predicting ambient concentrations using meteorological data for the 2005 year. The dust impacts predicted for 145 Mtpa were compared to those at 95 Mtpa rather than the currently approved 120 Mtpa because monitored data for 95 Mtpa throughput is available for model verification. This means the predicted dust impacts for 145 Mtpa can be determined as the difference above the existing, "known" level of impacts.

The derivation of the dust emission estimates for each operational source at East Intercourse Island and Parker Point is described in detail in **Appendix B.1**. The emission estimation approach used for modelling dust for the 2005 year and for the proposed increase in throughput to 145 Mtpa incorporated revised functions for estimating emissions from some sources based on a field sampling program conducted in October/November 2006.

Details of the dispersion model set-up and assessment of model performance at 145 Mtpa throughput are presented in **Appendix B.2** and summarised in the following sections.

6.5.4.1 Hamersley Iron Operational Sources of Dust

Dust suspended in the atmosphere is generated primarily by either wind or mechanical processes. Wind generated dust occurs when wind speed exceeds the erosion "threshold" velocity of the underlying surface. Under these conditions, particles greater than 100 μm are dislodged by shear forces and bounce and creep across the surface. These particles, by their bouncing, skipping motion, can dislodge smaller particles, which then remain suspended in the air. The amount of dust generated is therefore extremely dependent on the wind speed. Below the wind speed threshold (normally in the range of 5 to 10 m/s), no dust is generated, whilst above the threshold, dust generation increases with approximately the cube of the wind speed.

Mechanical processes which generate dust include movement such as grinding operations, dropping operations such as conveyor transfer points and vehicular movement. The amount of dust generated from these processes is not primarily dependent on the wind speed. The highest dust levels occur down wind under light wind conditions where dust plumes are relatively undispersed. The various sources of dust emissions at the Parker Point and East Intercourse Island facilities are listed in **Table 6-6**.

- **Table 6-6 - Sources of dust emissions at Hamersley Iron Operations.**

Source name[(a)]	Description	General controls	Emission frequency	Emission rate
EII 5E Conveyor	Airborne dust may be generated from the conveyor top and return strands and from deposits on the ground below the conveyor. Most of the ore deposited from the underside of the conveyors belt falls closer to EII than the mainland. These are cleaned up periodically (during conveyor shutdowns) using a specially designed front-end loader.	Water sprays along conveyor , improved belt cleaners, belt washing and top of conveyor covered and windward side covered	Activity dependent	Wind speed dependent
EII 5E Causeway Vehicles	The causeway road alongside the conveyor is sealed (speed limit 60 km/h) however dust generated from the conveyor or deposits underneath may be redeposited on the road surface. Vehicles running over the deposited dust may grind the particles further and cause dust generation. Vehicle may also emit dust deposited while on EII as they increase speed along the causeway, as well as drop accumulated mud onto the causeway.	Road sweepers used to clean road. Kerbing and sealing of road to make water truck more effective	Activity dependent	Activity dependent
1E/4E-5E transfer (on mainland)	Dust generation from conveyor surface and dropping during transfer to 5E conveyor.	Enclosures, water sprays.	Activity dependent	Wind speed dependent
EII/PP Bulk stockpiles	Wind-generated dust from the surface of these stockpiles. These vary in size and distribution within the bulk stockpile storage area.		Wind speed dependent	Wind speed dependent
EII/PP bulking	Vehicle-generated dust during bulking operations. Bulking involves the transfer of ore from live stockpiles to a separate bulk stockpile to blend ores. Typically, a front end loader loads from a live stockpile into haul truck. The haul truck transports the ore to a bulk stockpile where it is dumped and dozed. In the reverse operation, a front end loader loads from a bulk stockpile into haul truck which transports and tips the ore through a elevated grate hopper onto a conveyor for stacking to a live stockpile. Bulking for the 145 Mtpa proposal was originally modelled conservatively at 9 Mtpa in/out; however, recent re-assessment has determined that about 5.9 Mtpa in/out will be required. This revised bulking rate is applied in the modelling.	Water trucks used on haul roads. Water canon used to wet bulk stockpiles during tipping or loading. Truck-activated water sprays on in-loading hopper.	Activity dependent	Activity dependent

Source name[(a)]	Description	General controls	Emission frequency	Emission rate
EII/PP Live Stockpile areas (includes stockpile surfaces, open areas and road surfaces)	Wind-generated dust from the surface of these stockpiles.	Water trucks for road surfaces. Water cannon on all rows at East intercourse Island and Parker Point.	Wind speed dependent	Wind speed dependent
EII/PP operational area vehicles (excluding dust from bulking – treated separately)	Vehicle-generated dust from vehicle movements within the operations area.	Road sealing. Water trucks on unpaved roads.	Activity dependent	Wind speed dependent
EII/PP Stacking	Dust generation from dropping of ore from conveyor onto live stockpiles.	Automatically operated water sprays on stackers.	Activity dependent	Wind speed dependent
EII/PP Reclaiming	Dust generation during reclaiming from live stockpile and transfer to conveyor.	Water sprays on reclaimers.	Activity dependent	Wind speed dependent
EII/PP Screening Buildings	Dust generation during ore screening.	Baghouse	Activity dependent	Wind speed dependent
EII/PP Ship Loading	Dust generation during dropping of ore to ship.	Boom height control	Activity dependent	Wind speed dependent
EII/PP Transfers inloading	Dust generation from dropping during transfers on the way to live stockpiles.	Low dust emission design	Activity dependent	Wind speed dependent
EII/PP Transfers Outgoing	Dust generation from dropping during transfers ex live stockpiles.	Low dust emission control	Activity dependent	Wind speed dependent

Note: (a) Sources denoted EII/PP mean the same general facility/operation is in the EII and PP operational areas.

6.5.4.2 Estimates of Source Emissions for 145 Mtpa Throughput

The dust emission fluxes for the various plant and operations at the port are dependent on the ore type, moisture content and prevailing meteorological conditions. Because of this dependence, the amount of dust generated from Hamersley Iron's port operations can vary significantly from one year to another.

The proposed increase in throughput at Parker Point will result in an increase from its currently approved capacity of 75 Mtpa to 100 Mtpa. The emissions from Parker Point sources may change where:

- The operating frequency at which a dust-generating activity occurs (i.e. stacking, reclaiming, ship loading) changes;

- There are changes to the incoming/exported ore composition generating different ore dustiness;
- Additional controls have been implemented, thus reducing dust emissions; and
- The amount of bulking required to support operations at 145 Mtpa increases compared to that actually undertaken in 2005.

Estimates of the increase in dust emissions due to increased activity are based on proportional increases in the source throughput. The operating frequencies of major operational infrastructure for 95 Mtpa and 145 Mtpa are summarised in **Table 6-7**.

Table 6-7 - Use of operational parameters to estimate equipment emissions

Primary equipment for which operation periods data obtained	Ore	Associated equipment in use at the same time	Percentage of time operating at 95 Mtpa - 2005 (%)	Percentage of time operating at 145 Mtpa (%)
Car Dumper 1 – Parker Point (to be replaced by CD4)	Incoming ores	Inloading transfers PP Stacker	47.6	96.6
Car Dumper 3 – Parker Point	Incoming ores	Inloading transfers PP Stacker	22.1	96.6
Ship Loader 1 – Parker Point (to be replaced by SL3P)	Exported products	Reclaimer Conveyor(incl transfers) from Screenhouse 1 Parker Point to Ship Loader 1 Parker Point Conveyor(incl transfers) from Screenhouse 2 Parker Point to Ship Loader 2 Parker Point	57.4	76.6
	Exported Lump	Returning fines Stacker	25.3	21.0
Ship Loader 2 – Parker Point	Exported products	Reclaimer Outloading transfers from Live Stockpiles to Screenhouse 2 Parker Point Conveyor(incl transfers) from Screenhouse 2 Parker Point to Ship Loader 2 Parker Point	8.2	76.6
	Exported Lump	Returning fines Stacker	0.3	21.0
Car Dumper 2 – East Intercourse Island	Incoming ores	1/4-5E Transfer Point 5E Conveyor Inloading transfers EII Stacker	79.8	79.8

Primary equipment for which operation periods data obtained	Ore	Associated equipment in use at the same time	Percentage of time operating at 95 Mtpa - 2005 (%)	Percentage of time operating at 145 Mtpa (%)
Ship Loader 1 – East Intercourse Island	Exported products	Reclaimer Outloading transfers from Live Stockpiles to Screenhouse 1 East Intercourse Island Conveyor (incl transfers) from Screenhouse 1 East Intercourse Island to Ship Loader East Intercourse 1	69.6	69.6
	Exported Lump	Returning fines Stacker	19.1	19.1

Estimates in dust emission increases from expanded sources were based on proportional increases in throughput or size of the source in the case of the Parker Point live stockpiles. The emissions estimation approach incorporated the times of the actual activity of each stage of the ore handling operation (e.g. car dumping, stacking, reclaiming etc), with the operating frequencies for 2005 – nominally 95 Mtpa, being determined from the Hamersley Iron operational data base.

There will be changes to the incoming ore composition for 145 Mtpa since the market specifications will be changing and additional minesites will be contributing to the Port throughput. As the dust emissions are determined empirically for different ore compositions, the effect on the potential dustiness from the new compositions needs to be considered. The dustiness potential of ores at 145 Mtpa throughput compared to 95 Mtpa were estimated using the weighted dustiness's of all ores for 95 Mtpa and 145 Mtpa (**Table 6-8** and **Table 6-9** respectively).

- **Table 6-8 - Ore types being handled through the Dampier Ports for 2005 throughput.**

Ore Type	Ore	Throughput for Dampier Ports 2005 (%)
Incoming Ores		
Brockman Ores (mostly haematite)	Tom Price Lump	11
	Brockman Lump	5
	Paraburdoo Lump	12
Marra Mamba Ores (mostly goethite)	Marandoo Lump	8
Brockman Ores (mostly haematite)	Tom Price Fines	9
	Brockman Fines	11
	Paraburdoo Fines	12
Marra Mamba Ores (mostly goethite)	Marandoo Fines	9
	West Angelas Fines	0
Channel Iron Deposit Ores (pisolites)	Yandi Fines	23
Exported Products		
Brockman Ores (mostly haematite)	Brockman Lump	1
	Paraburdoo Lump	20
Marra Mamba Ores (mostly goethite)	Marandoo Lump	0
Haematites and goethites	Pilbara Blend 50 Lump	14
Brockman Ores (mostly haematite)	Brockman Fines	1
	Paraburdoo Fines	21
Haematites and goethites	Pilbara Blend 50 Fines	18
Channel Iron Deposit Ores (pisolites)	Yandi Fines	25

- **Table 6-9 - Indicative ore types being handled for the proposed 145 Mtpa throughput.**

Ore Type	Ore	Throughput for Dampier Ports predicted for 145 Mtpa (%)
Incoming Ores		
Brockman Ores (mostly haematite)	Tom Price HG	8
	Tom Price LG	2
	Brockman 2/fines	2
	Paraburdoo (wet), Eastern Range, Channar	6
	Brockman 4	1
Marra Mamba Ores (mostly goethite)	Marandoo	4
	Nammuldi	1
	Hope Downs	4
	West Angelas	9
Brockman Ores (mostly haematite)	Tom Price HG	7
	Tom Price LG	2
	Brockman 2/fines	4
	Paraburdoo (wet), Eastern Range, Channar	9
	Brockman 4	1
Marra Mamba Ores (mostly goethite)	Marandoo	6
	Nammuldi	2
	Hope Downs	6
	West Angelas	14
Channel Iron Deposit Ores (pisolites)	Yandi	10
Exported Products		
Haematites and goethites	Pilbara Blend	39
Haematites and goethites	Pilbara Blend	51
Channel Iron Deposit Ores (pisolites)	Yandi	10

The weighted average dustiness potential of ores at 95 Mtpa is about 4.7% compared to 5.3% for ores at 145 Mtpa (**Table 6-10**). This implies that on a per tonne basis, ore handling will be about 13% more dusty for 145 Mtpa than 95 Mtpa. This factor has been applied across all dust sources (including wind-generated) for 145 Mtpa throughput.

- **Table 6-10 - Comparison of average ore dustiness for 2005 and proposed 145 Mtpa throughput.**

Operational Scenario	Weighted Average DEM* (%)
Dampier Ports 2005	
Incoming Ores	4.9
Exported Products	4.5
Throughput for Dampier Ports predicted for 145 Mtpa (%)	
Incoming Ores	5.4
Exported Products	5.2

* Dust Extinction Moisture

The key additional dust controls for which an estimated dust control improvement has been incorporated into the modelling are given in **Table 6-11.**

- **Table 6-11 - Additional Dust Control Measures Incorporated into Dispersion Modelling for 145 Mtpa Throughput.**

Dust Source	Additional Dust Control Proposed for 145 Mtpa Throughput
5E conveyor and causeway	■ The conveyor is covered and the previously installed water sprays will be retained. ■ The causeway has been kerbed. ■ A new larger road sweeper is available for East Intercourse Island.
East Intercourse live stockpiles	■ Installation of 140 water cannons in stockyard at East Intercourse Island with associated pump stations to maintain delivery and water pressure. ■ A chemical dust suppressant will be added to stackers at East Intercourse Island to coat stockpile crests.
East Intercourse roads	Sealing of additional roads at East Intercourse Island (e.g. eastern and western sides of causeway and 5E/6E area) and between six stockpiles
Water Cannons at Parker Point	Installation of 221 (47 existing, 174 new) water cannons in live stockpile area at Parker Point with associated pump stations to maintain delivery and water pressure.

Other additional dust controls which have not been incorporated into the modelling include:

- Chemical dosing capability is being added to standpipes at East Intercourse Island and Parker Point for water truck application on roads (via spray bars) and stockpiles (via water truck mounted cannon); and
- Road sealing at Parker Point.

The control factors provided in NPI (2001) have been used as the primary basis for quantifying the benefit implementation of dust control measures. In some cases, estimates of control benefits are from test-work.

A summary of the estimated dust emissions for each source at 95 Mtpa and 145 Mtpa throughput, together with the additional controls, and associated effectiveness assumptions are presented in **Table 6-12**. The effect on annual average TSP emission rates is shown in **Figure 6.2** The average TSP emissions are estimated to increase from actual for 2005 of 160 g/s (5,000 tonnes) to 196 g/s (6,200 tonnes) for 145 Mtpa throughput under similar meteorological conditions and operating scenarios. Instantaneous dust emissions will vary with actual wind speed.

Given the prevailing wind direction and proximity, operations at East Intercourse Island have a proportionally more significant impact on dust levels in Dampier, than those at Parker Point. Consequently, additional dust suppression measures are focussed at East Intercourse Island. These measures have resulted in a 21% reduction in dust generated from operations on the island.

Dust generated from operations at Parker Point is estimated to increase from 51 g/s (actual for 2005) to 110 g/s for 145 Mtpa throughput. The actual impact of emissions from Parker Point operations on surrounding dust levels is very much dependent upon prevailing wind direction. As such, the resultant contribution from Parker Point operations to dust levels within the town of Dampier is considerably less than this increase.

Bulking for the 145 Mtpa proposal was originally modelled conservatively at 9 Mtpa in/out. However, recent re-assessment has determined that about 5.9 Mtpa in/out will be required. This revised bulking rate is applied in the modelling.

The major changes in estimated dust emissions between 145 Mtpa and 95 Mtpa are:

- The 145 Mtpa emissions estimate for all sources include an additional 13% for increased dust potential from the changes to incoming ores and operating frequencies for a 145 Mtpa throughput rate;
- Dust from the 5E conveyor and road is reduced from 5.1 g/s to 1.2 g/s due to the construction of a cover;
- Wind generated dust from the East Intercourse Island live stockpiles is reduced from 39.6 g/s to 19.5 g/s due to significant extension of water cannon coverage;
- The actual PP throughput for 2005 was 37 Mtpa. For an increased throughput at Parker Point to 100 Mtpa, the emissions from each Parker Point activity sources was increased by an additional 100/37 = 2.7 times;
- The Parker Point eastern bulk stockpile coverage for 2005 was only 7.5% (4,600 m^2). The total surface area of the Parker Point bulk stockpiles at 145 Mtpa is 120,500 m^2, which is a considerable increase.

- The wind generated dust from the bulk stockpiles at Parker Point increases by about 8.0 g/s due to the increase in the number of bulk stockpiles. Note that this increase is exaggerated by the very small bulk stockpile inventory actually held for 2005;
- Dust emissions from the Parker Point bulking operations increases by about 11 g/s due to a three and one-half times increase in activity levels of bulking activity proposed for 145 Mtpa compared to the actual level of bulking for 2005; and

The increase in dust emissions from the "activity" sources at Parker Point are approximately a pro rata increase in emissions for the amount of ore handled.

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Table 6-12 - Changes to Hamersley Iron sources and emissions resulting from proposed expansion to 145 Mtpa

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
EII Car Dumper	Internal water sprays and baghouse	Assume 5 mg/m^3 TSP emission based on CD1 stack tests	0.3	Assuming 5 mg/m^3 TSP emission	-	0.3
1-4E to 5E Transfer	Enclosure	Emission function modified after Dec 2005 monitoring.	1.0	No change		1.1
5E Conveyor and Road Vehicles	EII Car Dumper fitted with moisture monitoring and sprays. Water sprays fitted along the conveyor. High pressure, low volume sprays, belt scraper and conveyor drying system installed on return side of conveyor. New road sweeper shared between EII and PP.	Emissions estimated from monitoring program described in EA (2005).	5.1	Covering of conveyor, Improved return strand cleaning mechanism (reduces accumulation of spilt material underneath conveyor), Sealing sides of causeway, Kerbing & dimple strip on western side, New larger road sweeper dedicated to EII	NPI (2001) gives 50% control for windbreaks and 100% control for enclosure. Testing of the new scrapers only (ie without wash box) gave 67% reduction in dust on return belt . Assume 67% reduction in emissions.	1.2
EII Stacking	Wind shielding fitted to stacker boom discharge sprays.	Incorporated into emissions function.	1.9	No change		2.6

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
EII Live Stockpiles & Roads – wind	Water cannon on south west face. Road wetting.	50% effective for 1/26th of total stockpile area. Incorporated into emissions function.	39.6	Water canon coverage extended to cover entire stockpile area. Water applied when winds > 20 km/hr and 248-314° (Dampier). Crusting agent to be added on final stockpile ridges (±10m). Ability to add water (or crusting agent) to all EII stockpiles.	NPI (2001) gives 50% control for water sprays. Wind tunnels tests indicate water sprays are 90% effective. Assume 40% effective when operating. Wind tunnel tests indicate agent 91-96% effective. Assumed 40% effective.	19.5
EII Reclaiming	-	Incorporated into emissions function.	5.4	Water reelers and sprays to be fitted to the three bridge reclaimers	NPI (2001) gives 50% control for water sprays. Assume 30%[1] effective.	4.5
EII bulking operations	Water sprays fitted to dump hopper. Water sprays from water truck used on bulking areas.	NPI (2001) gives 50% control for water sprays Assumed 30% effective.	13.6	No change	-	15.3

[1] NPI for Mining suggests 50% reduction in dust emissions with the use of water sprays. A more conservative assumption of 30% is made here.

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
EII Bulk Stockpiles – wind	-	Incorporated into emissions function.	9.7	No change	-	11.0
EII Screening Building	-	Incorporated into emissions function.	10.0	No change	-	11.4
EII Screening Building – wind	-	Incorporated into emissions function.	5.6	Improved sealing between vibration feeder and belt and around screens to reduce spillage.	Not quantified.	6.3
EII operational areas Vehicles	Road wetting.		5.5	Road sealing of 15% of EII roads. New road sweeper dedicated to EII. Use of dust retardant on unpaved roads.	Overall dust control benefit = 14%	5.5
EII Transfers Outgoing + Ingoing	Enclosures.	Incorporated into emissions function.	3.5	No change	-	4.0
EII Conveyors from Screenhouse 1 to SL1E (incl 20E/21E)	Wetted at Screen House	Based on monitoring of PP7P x 3.	4.0	Improved belt cleaner (5E design) and dust de-ionising scrubber (removed fine dust from top of belt after transfer point).	Tests indicate belt cleaner removes 67% of dust from return strand. Assume 67% effective.	1.5

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
EII Ship Loading	Boom control.	Incorporated into emissions function.	3.6	Fitted with boom sprays (separate project but similar timing). Also improved transfer belt design to reduce spillage. Replacement shiploader similar to new SL1P	Assumed 30% effective.	2.4
PP Car Dumper 1	Internal water sprays.	50 mg/m^3 TSP emission	0.2	-	Decommissioned	-
PP Car Dumper 3	Internal water sprays, Baghouse.	Emission rate revised based on 5 mg/m^3 TSP emission after stack testing 2006.	0.1	No change	-	0.3
PP Car Dumper 4	As for CD3P.	As for CD3P.	-	No change	-	0.3
PP Live Stockpiles & Roads	For existing product range, 21 stockpiles are non MMF Stockpile sprays on north side of 3P/5P and eastern end – covers total of 9 of these stockpiles. 3 stockpiles are MM with water cannon.	Use of water sprays not yet implemented. No special MMF stockpiles. 40% capacity for 2005.	10.8	Total stockpiles=24. Only two fines and two lump products produced. Water canon coverage extended to cover entire stockpile area. Water applied when winds > 20 km/hr and 0 – 72° (Dampier). Average stockpile area utilisation is 65%.	NPI (2001) gives 50% control for water sprays. Assume 40% effective when operating.	19.2

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
PP Stacking	Manually operated water sprays on stackers.	Incorporated into emissions function.	5.8	No change	-	15.0
PP Reclaiming	-	Incorporated into original function	7.5	No change	-	19.0
PP Screen House (SH1P)	-	Emission function modified after Dec 2005 monitoring.	4.6	-	Decommissioned	-
PP Screen House wind dust	-	Incorporated into original function	4.9	-	Decommissioned	-
PP Screen House 2	Improved efficiency of materials transfers within structure reduces localised dust deposition.	Assumed to be 0.5 of SH1P emission rate (after SH1P doubled after Dec 2005 monitoring)	0.0	No change	-	2.5
PP Screen House 2 wind dust	-	Same wind dust function as Parker Point Screenhouse area wind	-	Improved efficiency of materials transfers within structure reduces localised dust deposition. New dedicated road sweeper at PP.	50% reduction	2.8
PP Screen House 3	New for 145 Mtpa.	-	-	As for SH2P.	As for SH2P.	2.5

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
PP Screen House 3 wind dust	New for 145 Mtpa.	Same wind dust function as Parker Point. Screenhouse area wind.	-	As for SH2PW.	50% reduction.	2.8
PP operational areas Vehicles	Road wetting.		5.5	Minor (est 10% increase in traffic). Extra road sealing. New dedicated road sweeper at PP.	No change.	6.2
PP Transfers Outgoing + Ingoing	Low dust emission control.	Incorporated into emissions function.	3.1	Installation of water sprays and more effective enclosures. Improved return strand belt cleaners to reduce spillage.	NPI (2001) gives 50% control for water sprays and 100% control for enclosure. Assumed 30% effective.	6.7
PP Conveyor from Screenhouse 1 to Ship Loader 1 – wind	Wetted at screen house	Incorporated into emissions function.	1.8	New slower moving wider belt conveyors.	Assume 10% effective.	4.1
PP Ship Loader	Boom height control.	Incorporated into original function.	2.9	Decommissioned.	-	-
PP Ship Loader 2	Boom height control. Fitted with boom sprays.	30% effective.	0.5	No change.	-	2.9
PP Ship Loader 3	-	-	-	As for SL2P.	Simulated using EII operations data for 2005 x 110%.	2.9
PP Bulk Stockpiles – wind		Incorporated into original function	0.3	Water sprays on Northern Bulk Stockpile stacker		8.3

Source	95 Mtpa (Parker Point=50 Mtpa)			145 Mtpa (Parker Point=100 Mtpa) [a]		
	Dust controls at 95 Mtpa	Effectiveness Assumptions	Average emission rate 2005 data (g/s)	Dust control modifications	Effectiveness Assumptions	Average emission rate[b] (g/s)
PP Bulking operations	Water sprays on dump hopper for loading into live stockpile area. Road wetting/haul truck emissions as per SKM functions in EA (2003).	30% effective	3.2	No change	-	24.0
TOTAL			160			196

(a) All sources to have extra 13% dustiness factor added.

(b) All PP activity sources in each circuit have extra 10% of 2005 EII Car dumper and shiploader operating frequencies.

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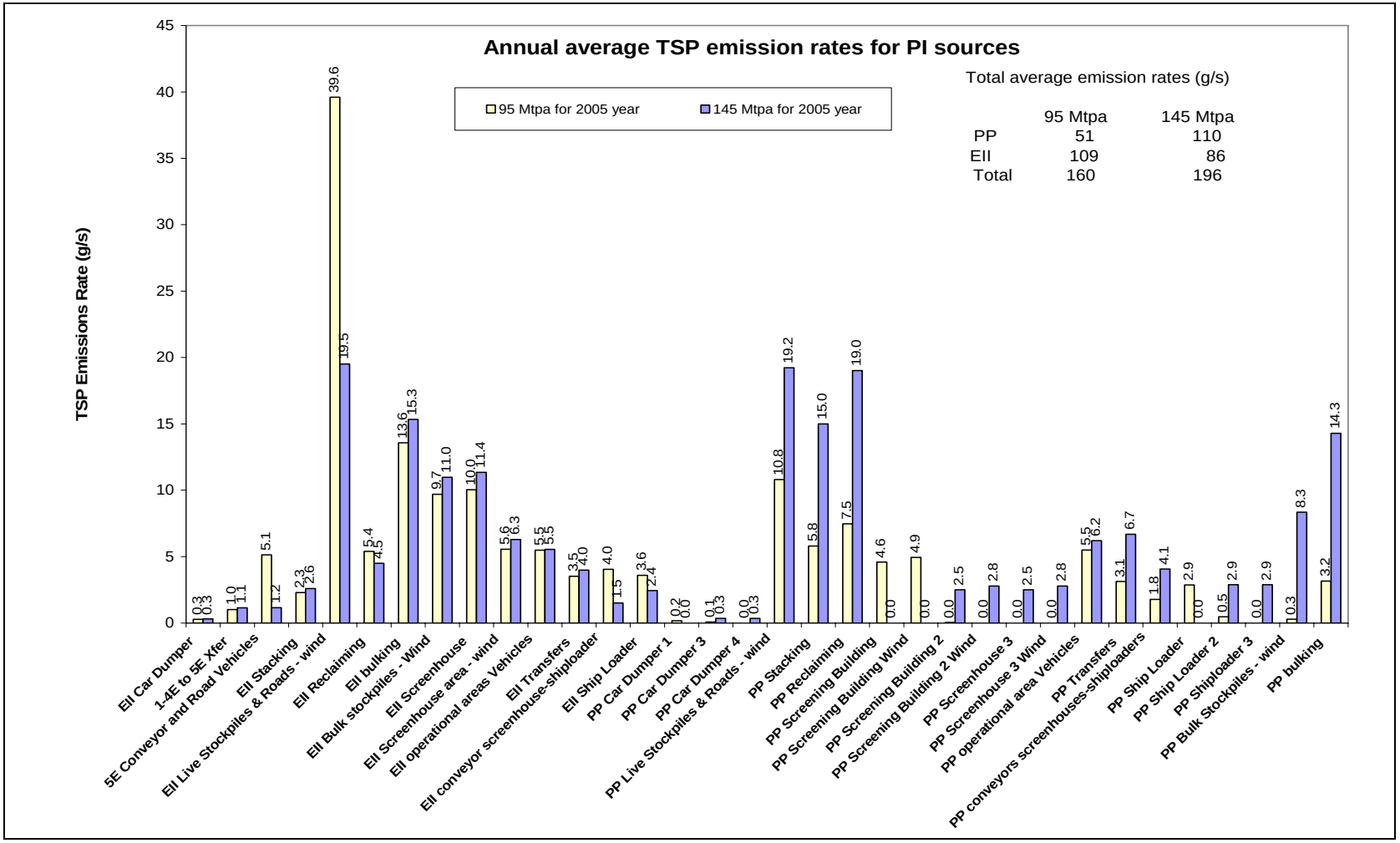

- **Figure 6.2 - Annual average TSP emission rates for Hamersley Iron sources at 95 Mtpa and 145 Mtpa**

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6.5.4.3 Effect of Proposal on Dust Levels in Dampier and King Bay

The prediction of current and proposed dust levels across the Dampier township and King Bay is described in detail in **Appendix B.3** of this document.

The indicators used to assess the change to dust levels for the proposed increase in throughput are:

- The 6th highest 24-hour PM_{10} concentrations. The NEPM goal requires this to be less than 50 $\mu g/m^3$;
- The 6th highest 24-hour TSP concentrations. Using the Kwinana EPP as a guide, reasonable goals would be for this not to exceed 90 $\mu g/m^3$ for Dampier townsite and not to exceed 150 $\mu g/m^3$ at King Bay; and
- The annual average PM_{10} and TSP concentrations.

A summary of the changes in ambient dust concentrations and deposition rates at Dampier and King Bay resulting from the proposed capacity increase to 145 Mtpa is given in **Table 6-13** and **Table 6-14.** Contours of the predicted 6th highest 24-hour PM_{10} and TSP concentrations for Dampier and King Bay are presented in **Figure 6.3** and **Figure 6.4** respectively. **Figure 6.5** and **Figure 6.6** show contours of the predicted 6th highest 24-hour TSP and the maximum monthly dust dry deposition for 145 Mtpa from Hamersley Iron sources.

"Background" levels in these tables were estimated by comparing the predicted concentrations for 95 Mtpa to the measured concentrations for 2005 at the monitoring sites for the days during which the monitoring data was actually available. The "background" levels are actually the difference between:

- the measured concentration, which included contributions from regional background and localised sources near the monitor, and
- the modelled/predicted concentration, which are from Hamersley Iron operations only,

for each ranked pair of measured and modelled/predicted 24-hour average concentrations – or for the measured and modelled/predicted annual average concentrations, as relevant to the concentration statistic (percentile or annual average) being compared.

A reason for using this approach is that the highest dust levels may occur on windy days when background dust levels may also increase along with Hamersley Iron's contribution to ambient dust levels. If, for 145 Mtpa, a constant "average" background dust level was added to Hamersley Iron's modelled/predicted contribution for high dust-event days, it may under-estimate the total dust level.

The definition of "background" also inherently implies that the under-prediction in the modelled concentrations compared with the Hamersley Iron contribution to the measured concentrations that

was estimated from the monitoring data as described in the modelling verification report (EA 2007b), is less likely to compromise the validity of the modelled predictions for 145 Mtpa.

For parameters where there was substantially less than a full year's monitoring data available[2], the 6th highest 24-hour average concentrations could be underestimated because the days during which the highest dust impacts occurred may not have been measured. To try and minimise the effect of this problem, the (modelled) "Contributions from HI (All days)" are for all days in the year and the "Total concentrations" are the addition of this modelled concentration and the "background" concentration as described above. The 6th highest "Total concentration" is therefore the best estimate of the 6th highest concentration that may have occurred during the year irrespective of the number of days in the year the monitoring was actually working.

[2] For King Bay, there were only 111 days of measured PM10 data for 2005. Similarly for PM2.5 measured at the DPS where only 53 days of data were available. It is possible that the 6th highest background concentrations are under-estimated because less than a full year's data are available.

- **Table 6-13 - Summary of change in dust impacts at Dampier for proposed capacity increase.**

Parameter	Criterion	Concentration (µg/m^3)						Change in Totals from 95 Mtpa to 145 Mtpa	
		95 Mtpa			145 Mtpa			Relative[(a)] (%)	Absolute[(b)] (µg/m^3)
		Contribution from Hamersley Iron (All days)[(c)]	Background and other sources	Total	Contribution from Hamersley Iron (All days)[(c)]	Background and other sources	Total		
6th highest 24-hr avg [PM_{10}]	50	22.5	24.6	47.1	23.0	24.6	47.6	1.0	0.5
Annual avg [PM_{10}]	-	6.8	15.5	22.3	5.6	15.5	21.1	-5.7	-1.3
6th highest 24-hr avg [TSP]	90	32.6	44.1	76.7	29.2	44.1	73.3	-4.4	-3.4
Annual avg [TSP]	-	10.0	19.5	29.5	8.1	19.5	27.6	-6.4	-1.9
6th highest 24-hr avg [$PM_{2.5}$]	25	10.6	7.9	18.5	11.6	7.9	19.6	5.7	1.1
Annual avg [$PM_{2.5}$]	8	3.0	4.5	7.6	2.5	4.5	7.1	-6.5	-0.5
Deposition (g/m^2/month)									
Annual average	2[(d)]	0.46	-	-	0.34		-	-26.0	-0.12
Maximum monthly	-	0.91	-	-	0.54		-	-41.0	-0.37

(a) Calculated from (Total_145 / Total_95 x 100) - 100.

(b) Calculated from Total_145 -Total_95.

(c) Note that the "Contribution from HI (All days)" is the modelled/predicted contribution from modelling all days in 2005

(d) Criterion for additional insoluble deposited dust from HI operations only, ie excluding background

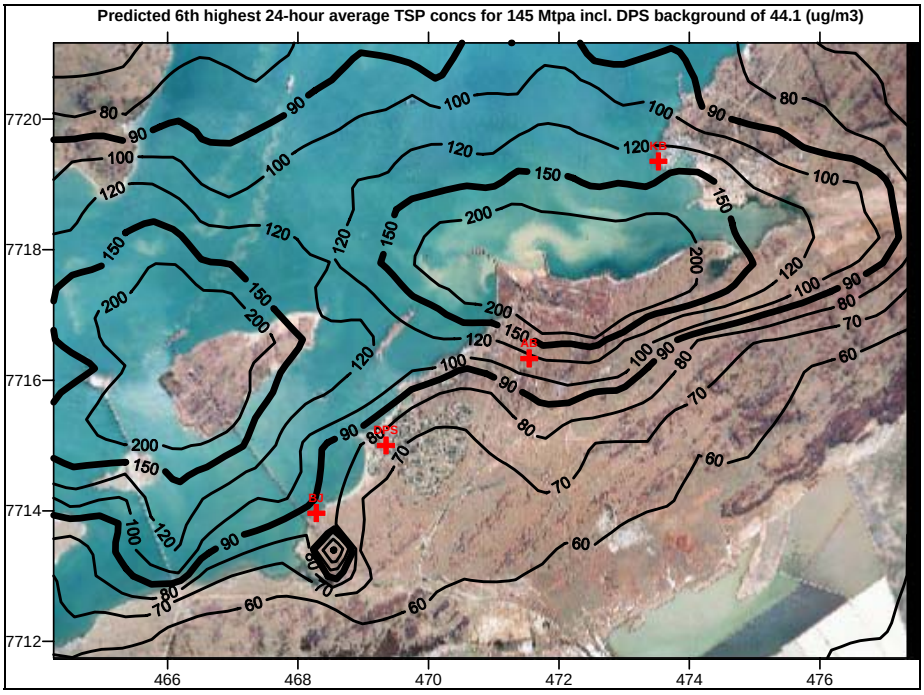
- **Table 6-14 - Summary of change in dust impacts at King Bay (monitor site) for proposed capacity increase.**

Parameter	Criterion	Concentration (µg/m^3)						Change in Totals from 95 Mtpa to 145 Mtpa	
		95 Mtpa			145 Mtpa			Relative[(b)] (%)	Absolute [(c)] (µg/m^3)
		Contribution from Hamersley Iron (All days)[(a)]	Background and other sources	Total	Contribution from Hamersley Iron (All days)[(a)]	Background and other sources	Total		
6th highest 24-hr avg [PM_{10}]	-	30.4	12.8	43.2	57.1	12.8	69.9	61.9	26.7
Annual avg [PM_{10}]	-	8.6	9.2	17.8	15.0	9.2	24.3	36.3	6.5
6th highest 24-hr avg [TSP]	150	49.6	23.0	72.5	94.7	23.0	107.7	48.4	35.1
Annual avg [TSP]	-	12.5	11.6	24.1	21.7	11.6	33.3	38.1	9.2

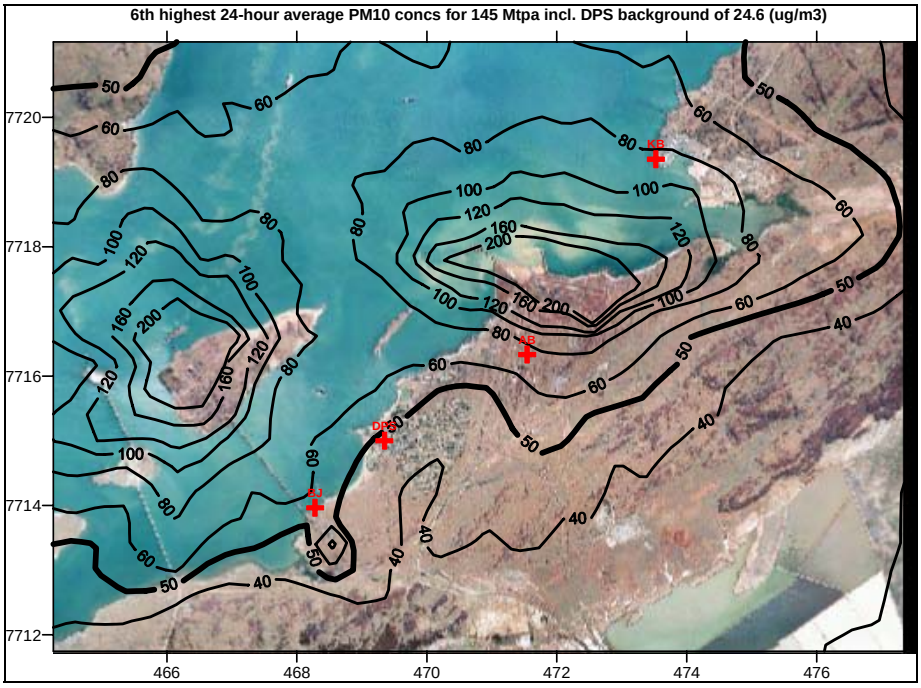
(a) Note that the "Contribution from HI (All days)" is the modelled/predicted contribution from modelling all days in 2005

(b). Calculated from (Total_145 / Total_95 x 100) - 100

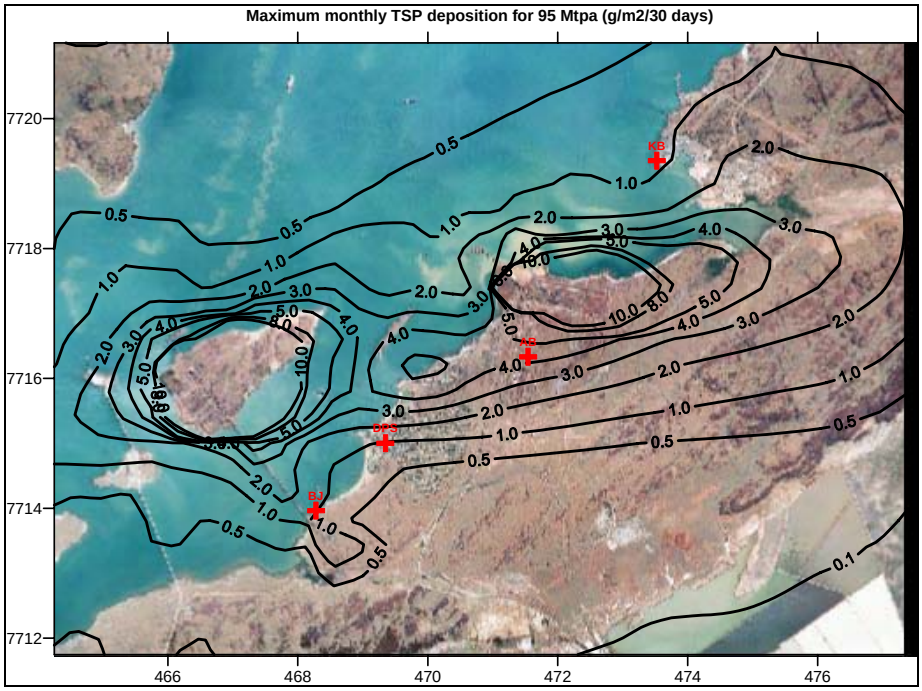
(c) Calculated from Total_145 -Total_95.



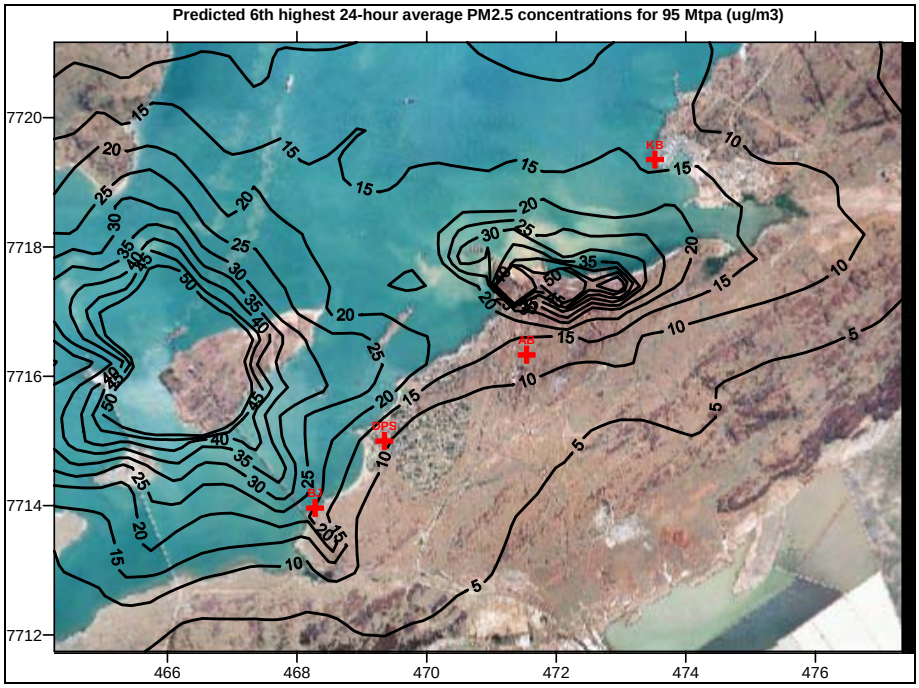
- **Figure 6.3 - Predicted 6th highest 24-hour average PM_{10} concentrations for 145 Mtpa throughput (including background).**



- **Figure 6.4 - Predicted 6th highest 24-hour average TSP concentrations for 145 Mtpa throughput (including background).**



- **Figure 6.5 - Predicted 6th highest 24-hour average $PM_{2.5}$ concentrations for 145 Mtpa throughput.**



- **Figure 6.6 - Predicted maximum monthly dust dry deposition for 145 Mtpa throughput**

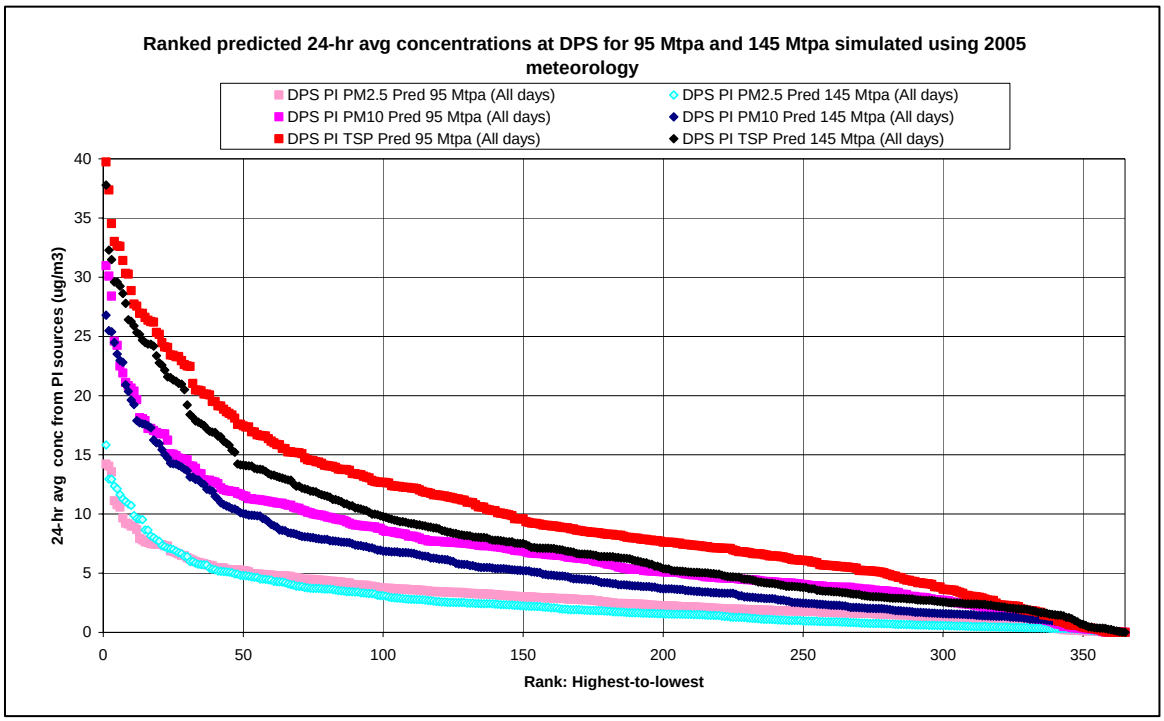
The proposal to increase throughput to 145 Mtpa has a minor effect on the peak short-term concentrations, ie the 24-hour PM_{10} and TSP concentrations at the Dampier Primary School.

Table 6-15 presents the six highest 24-hour averages for 95 Mtpa (measured) and 145 Mtpa (predicted) throughputs. For 95 Mtpa, the NEPM 24-hour average concentration of 50 $\mu g/m^3$ was exceeded four times in the year. For 145 Mtpa, this concentration is predicted also to be exceeded four times per year (when background concentrations are also considered).

- **Table 6-15 - Change in highest 24-hour average PM_{10} concentrations at Dampier Primary School site.**

Rank	24-hour average PM_{10} concentration over 2005 year ($\mu g/m^3$)					
	95 Mtpa			145 Mta		
	As measured by TEOM	As modelled/ predicted for 95 Mtpa from HI	"Background" (ie difference between modelled/ predicted from HI, and measured)	"Background" - as for 95 Mtpa	As modelled/ predicted for 145 Mtpa from HI	Total modelled/ predicted for 145 Mtpa
1st	69.6	31.0	38.6	38.6	26.8	65.4
2nd	60.9	30.1	30.8	30.8	25.5	56.3
3rd	56.9	28.4	28.5	28.5	25.4	53.9
4th	55.1	24.6	30.5	30.5	24.5	55.0
5th	48.0	24.3	23.7	23.7	23.5	47.6
6th (NEPM reference)	**47.1**	**22.5**	**24.6**	**24.6**	**23.0**	**47.6**

The distribution of predicted 24-hour average concentrations at Dampier Primary School over a full year is shown in **Figure 6.7**. In this plot, the 24-hour average concentrations predicted for 145 Mtpa ordered from highest to lowest are plotted against the 24-hour average concentrations predicted for 95 Mtpa ordered from highest to lowest. This illustrates that for 145 Mtpa, most 24-hour average concentrations are less than for 95 Mtpa except for the top seven days of $PM_{2.5}$.



- **Figure 6.7 - Ranked predicted 24-hour average concentration at Dampier Primary School for 95 Mtpa and 145 Mtpa simulated using 2005 meteorology.**

The actual contribution that a particular source makes to ambient dust concentrations in Dampier will be dependent not only on the emissions flux, but also on the prevailing meteorological conditions and the location of the source relative to Dampier.

Previous analysis (SKM, 2005) indicates that East Intercourse Island sources are the dominant contributors to the top six 24-hour PM_{10} concentrations predicted for the Dampier Primary School site for a throughput of 95 Mtpa. However, for the proposed 145 Mtpa throughput, Parker Point sources are the dominant contributors to the top short-term event at Dampier Primary School, with either East Intercourse Island or Parker Point sources or a combination of the two being dominant contributors for the 2nd to 6th highest events. This shift in dominant sources from East Intercourse Island to Parker Point is due to a higher frequency of night-time activities proposed at Parker Point for the 145 Mtpa scenario. For 95 Mtpa bulking was assumed to occur only during the day light hours, however, this activity is virtually continuous (day and night) for a throughput of 145 Mtpa. The stable atmospheric conditions which typically prevail at night lead to less dispersion than occurs during the day, potentially giving rise to higher dust levels. Consequently, night-time impacts at Dampier from activity-generated dust at Parker Point, has increased for 145 Mtpa throughput.

The source contributions to the annual average PM_{10} concentrations at Dampier Primary School for 95 Mtpa and 145 Mtpa throughputs are presented in **Figure 6.8.** There is an obvious reduction in the contribution from the 5E conveyor and East Intercourse Island live stockpiles. The sources contributing most to increased average dust levels are Parker Point reclaiming and Parker Point bulking.

The predicted changes to Dampier's dust levels from the increased throughput to 145 Mtpa are minor compared to the existing situation and most likely within the bounds of emissions estimation and modelling uncertainties. For the key criteria used to assess dust impacts – which for concentrations include contributions from background and other sources, the predictions for the proposed throughput at 145 Mtpa are as follows:

- The NEPM 6th highest 24-hour PM_{10} concentration goal of 50 μg/m^3 is predicted to be met at the DPS site although exceeded in the northern part of the Dampier township. This is similar to the current situation.

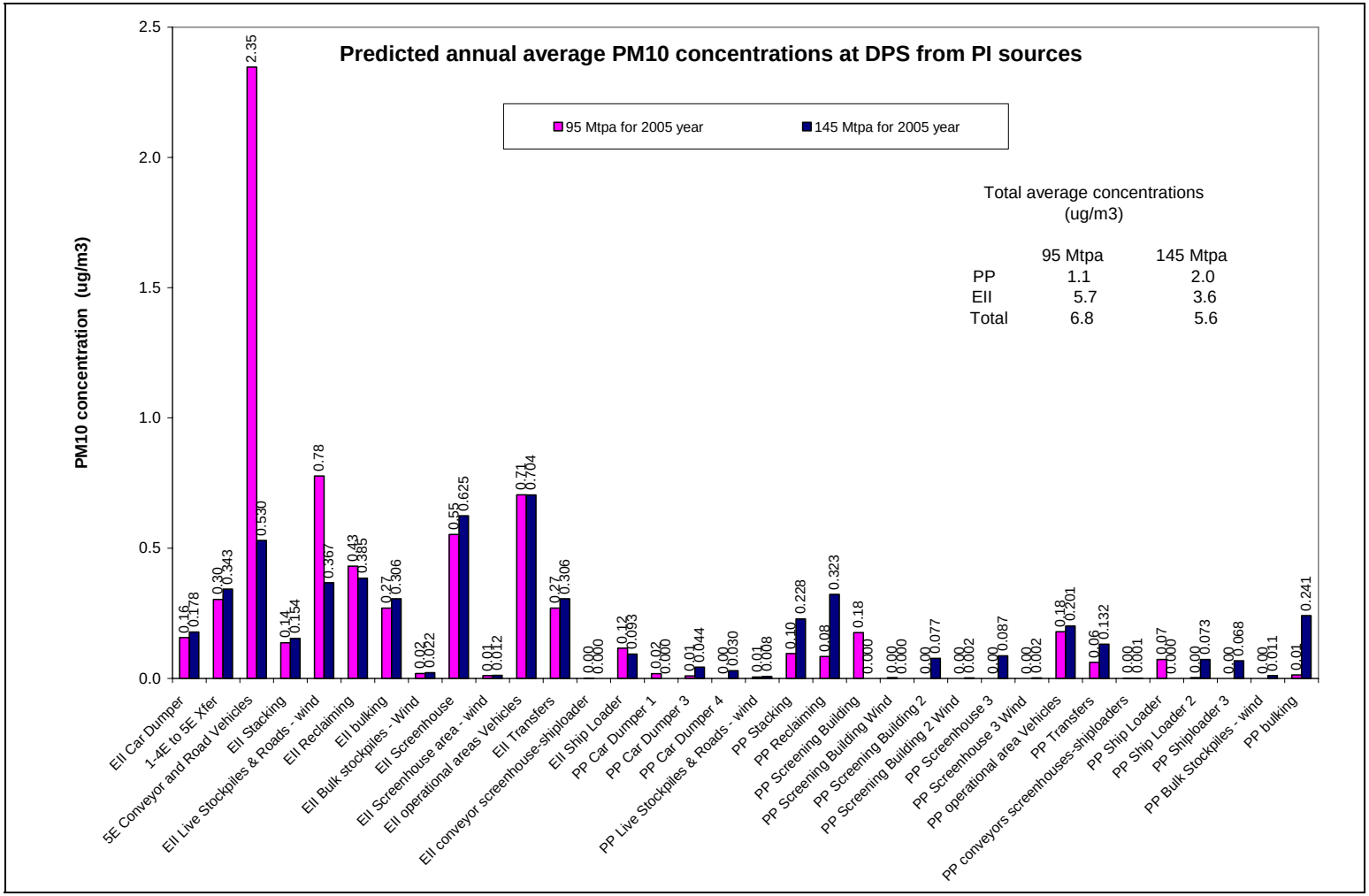
- Similarly, the Kwinana EPP residential 6th highest 24-hour TSP concentration of 90 μg/m^3 is predicted to be met at the DPS although exceeded in the northern part of the Dampier township. This is similar to the current situation.

- The predicted average dust deposition in the Dampier township for both 95 and 145 Mtpa is within NSW dust deposition criterion of 2 g/m^2/month with a 26% reduction being predicted for 145 Mtpa.

- The maximum monthly dust deposition for both 95 and 145 Mtpa exceeds the NSW dust deposition criterion in the northern-most part of the Dampier township, however it is slightly reduced for 145 Mtpa.

Dampier is the nearest residential area to Hamersley Iron's port operations. However, with downstream processing facilities planned for the King Bay – Hearson Cove Industrial Estate and the planned expansion of the Dampier Port facilities at King Bay, it is appropriate to determine the likely impacts in these areas. The annual average PM_{10} and TSP concentrations are predicted to increase by between 36 and 38% while the 6th highest PM_{10} and TSP 24-hour concentrations are predicted to increase by about 62% and 48%, respectively. The predicted increases in dust levels at King Bay are more extreme than for the Dampier township because of the substantial measures to reduce dust emissions from East Intercourse Island and Parker Point in relation to dust on the town of Dampier (e.g. operational use of water cannons). In addition, King Bay is in close proximity to the bulking activities which has been identified as a significant potential source of dust. There are fewer such measures proposed for Parker Point designed specifically to reduce impacts at King Bay. Despite the increase in ambient concentrations, the Kwinana EPP goal of 150 μg/m^3 is predicted to be satisfied at King Bay (i.e. 108 μg/m^3). As discussed in **Section 6.5.3.1**, the ambient

concentrations for air quality criteria within industrial areas are higher than for residential areas. The process for developing air quality criteria considers that residents are exposed to ambient concentrations for up to 24 hours per day, while occupational exposure is typically only for 8 hours



- **Figure 6.8 - Predicted annual average PM_{10} concentrations at Dampier Primary School from Hamersley Iron sources**

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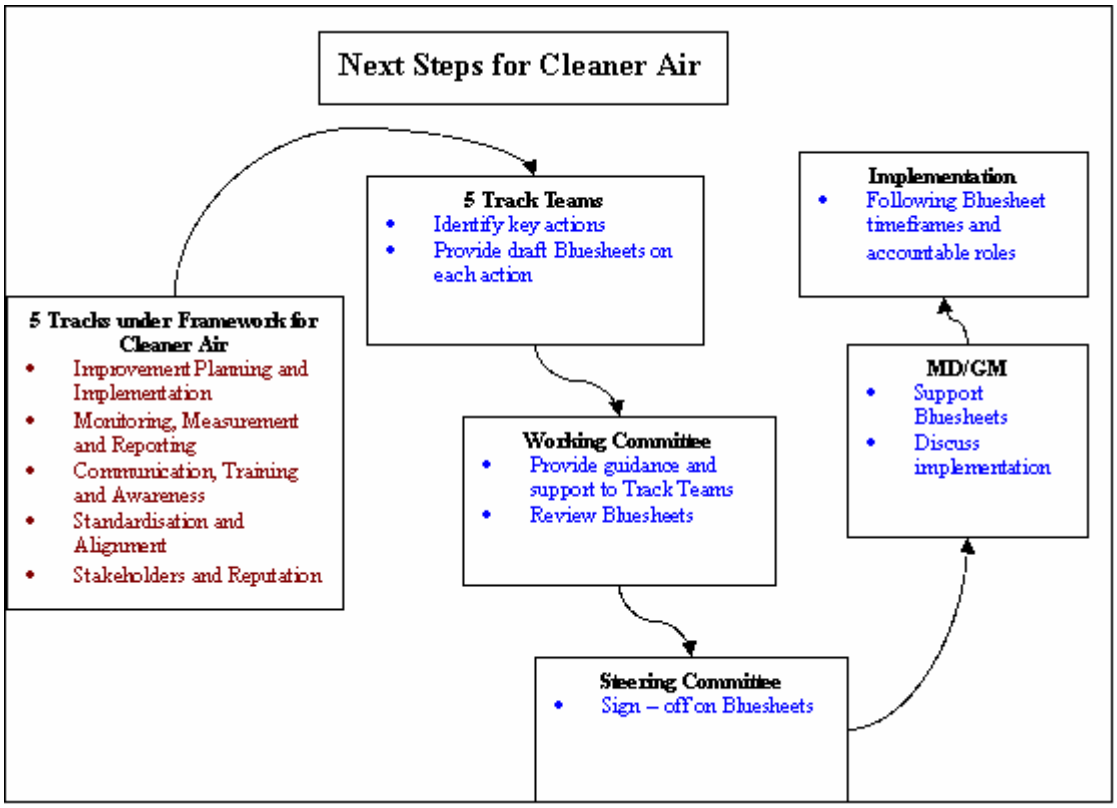
6.5.5 Management Strategies

In recognition of the potential that the airborne dust generated from the increased activity at Parker Point may impact on the surrounding residential areas, Hamersley Iron will continue to identify and implement operational changes to reduce dust generation. Hamersley Iron will, on an annual basis:

- Review dust risks, set objectives and targets to address the significant risks;
- Meet policy commitments;
- Meet any legal and other requirements and stakeholder concerns; and
- Commit to Dust Suppression Improvement Plans to meet objectives and targets.

It is recognised that in order to manage the issues associated with dust emissions across Pilbara Iron sustainably, it will take a whole of business approach. The Cleaner Air Program aims to identify and develop actions to address key risk relating to dust management and to encourage collaboration throughout Pilbara Iron and Rio Tinto Iron Ore.

Pilbara Iron's Steering and Working Committees have been established to provide direction and coordinate business effort in response to the PI Framework for Cleaner Air objective "to control dust and manage risks related to Health, Safety, Environment and financial impacts, as well as legislative requirements and sound government relations". The Cleaner Air process is illustrated in **Figure 6.9**. A key element of the program is the establishment of a Cleaner Air Management Team which will develop a three year Dust Management Strategic Plan.



- **Figure 6.9 - Five key "tracks" for development of the Cleaner Air Program**

6.5.6 Dust Management Initiatives

As a result of the proximity of the Dampier townsite to the Hamersley Iron operations, the potential for impacts of airborne dust is a significant issue for the company and local community. Although it is fundamental that dust reduction is designed into new developments, operational procedures also play a key role in minimising dust generation. As such, Hamersley Iron has adopted a two-pronged approach to dust suppression and dust management at its expanding Dampier operations. A range of dust suppression initiatives has been incorporated in previous and current upgrades. These initiatives are complemented by an ongoing commitment to improvement in operational and maintenance performance with respect to dust reduction.

In accordance with Hamersley Iron's commitment to continuous improvement and to ensure that the various port upgrades have not resulted in an increase in ambient dust levels in Dampier, facilities have been designed to incorporate appropriate dust control measures. These measures, which are listed in **Table 6-16**, have been based on an understanding of the dust generation mechanisms at Parker Point and what is required to mitigate dust generation.

- **Table 6-16 - Dust Suppression initiatives implemented at Dampier Port as part of recent upgrades or developments.**

Implemented as part of 95 Mtpa upgrade
Installation of water sprays along the East Intercourse Island 5E conveyor
Installation of belt washing station on return side of the East Intercourse Island 5E Conveyor
Installation of water sprays at East Intercourse Island car dumper, Parker Point bulk stockpile hopper, East Intercourse Island bulk stockpile hopper
Installation of water cannons on the north side of East Intercourse Island stockyard, north and east side of Parker Point stockyard and on the Marra Mamba fines stockpiles within the Parker Point stockyard.
Installation of dry baghouse on Car Dumper 3 at Parker Point
Water addition to the ore at the mine so that when it reaches the port the dust generated is minimised
Installation of a in-line moisture analyser at Parker Point car dumper allowing feedback to the mines on moisture levels
Car Dumper 3 enclosed and incorporates fogging sprays.
Installation of sprays on new longer conveyors at parker Point to reduce dust lift off.
Installation of low emission transfer chutes on major transfers.
Implemented as part of the current programme to replace car dumper, screen house and ship loader
Installation of water fogging sprays at the car dumper hoppers to suppress the fugitive emissions from the dumping process
Application of water spray on full ore car immediately prior to dumping
Car Dumper 3 housed within enclosure
Car dumper and screen house facilities fitted with dry dust collection system.
Car Dumper 4 is same design as Car Dumper 3 and is enclosed and has dry dust collector and fogging sprays.
On-line monitoring of ore moisture content at car dumper conveyor
Water added to conveyor transfer chutes
Water sprays fitted to the new ship loader
Stockpile dust suppression water cannons to all live stockpiles at Parker Point stockyard with automatic control by weather station
Stockpile dust suppression water cannons to all live stockpiles at East Intercourse Island
Two new water trucks and chemical mixing stations for application of stockpile surface sealing agent at East Intercourse Island and Parker Point. Water trunks will be specifically designed to apply sealing agent to bulk and live stockpiles.
Installation of sprays on new conveyors at Parker Point to reduce dust lift off
Installation of low emission transfer chutes on major transfers
Stackers will be modified to not only add water but to add sealing agent at East Intercourse Island

Hamersley Iron's operational strategy for dust management is described in its Dust Management Plan (**Appendix B.4**) for its Dampier operations. The document describes details on the action plan for the next operating period and analyses dust performance over the previous reporting period. The dust strategy is intended to provide a reproducible and consistent approach for

managing dust generated by Hamersley Iron port operations, with the aim of continuously reducing levels of fugitive dust generated by operations.

The Dust Management Plan includes a dust suppression improvement plan which is reviewed and updated each year. Completed initiatives of recent improvement plans are listed in **Table 6-17**.

Of particular note is the installation of dust cover over the 5E conveyor, together with dust suppression hood sprays on the 5E conveyor across to East Intercourse Island. A belt washer has also been installed to reduce dust from the 5E conveyor return stand. These measures have resulted in a visible reduction in dust. Similarly, a notable reduction in visible dust has also been achieved through the installation of low volume dust sprays installed on the bulk hopper at East Intercourse Island.

- **Table 6-17 - Dust suppression initiatives implemented at Dampier Port as part of recent upgrades or developments.**

Implemented as part of Dust Suppression Improvement Plan
Establish a Dust and Water Management Team comprised of key Operation personnel that meet monthly to co-ordinate projects to improve management of dust and water
Using water trucks to wet the bulking stockpile areas, roads and other cleared areas to minimise dust generated from bulking, vehicles and wind.
Use of road sweeper to clean up spillages of material on roads
Regular clean up of ore spillages under conveyors and plant
Use of bitterns on unsealed roads to control dust extended to additional roads within the port to reduce the need for watering the roads for dust suppression
Seal high usage dirt roads to reduce dust emissions and therefore reduce the need for watering roads
Dust enclosure hood and side panel fitted to conveyor 5E
Review and update operating procedures to ensure dust management requirements are clearly defined.
Installation of additional dust monitoring equipment to enhance existing monitoring program (underway)
Development of a new web site to provide both Hamersley Iron and the community dust monitoring results from Dampier, Karratha and Cape Lambert at “real time” (underway)
On-site trials of various dust suppressant/crusting products and wind tunnel testing of other products, to identify the best product to apply to stockpiles to form a crusted surface to reduce dust lift-off and reduce water use.
Implement a process to use site specific weather forecasts for proactive dust control
Analysis of products to determine optimum moisture content of ores, taking account of ore dustiness

As part of the Dust Management Plan, a recent review of dust risks identified a further thirteen action items for the 2005-2006 operating period. The action items, with timeframe for completion and current status are listed in **Table 6-18.**

- **Table 6-18 - Dust Suppression Improvement Programme 2005 - 2006**

Action No.	Action	Status
2005.01	Replace the PM_{10} dust monitoring equipment at Karratha which was recently modified to monitor $PM_{2.5}$	Completed
2005.02	Undertake a more detailed study on the potential effectiveness of a top strand cover on 5E conveyor	Study complete. Trial section installed. Modifications to existing structure almost complete.
2005.03	Implement selected options from external study on dust suppression options for 5E conveyor including improved return strand cleaning mechanism and widening of 5E causeway road.	Completed
2005.04	Trial crusting agents on stockpiles.	Completed.
2005.05	Implement a process to use site-specific weather forecasts for proactive dust control strategies.	Proactive forecasts being received. Dust risk matrix developed. Review of forecast accuracy complete. Dust control flowchart being developed.
2005.06	Improve monitoring of dust suppression controls to ensure dust mitigation procedures and practices are followed.	Completed
2005.07	Investigate dust suppression options for 20E and 21E at East Intercourse Island.	Design work for 20E and 18E return strand cleaning stations in progress. Design work for Roxon clear dust suppression unit in progress.
2005.08	Purchase second road sweeper (to be dedicated to East Intercourse Island).	Completed. New sweeper now operational.
2005.09	Install additional kerbing on selected sealed roads at East Intercourse Island and Parker Point.	Sections completed with 5E roadworks. Further works planned.
2005.10	Undertake on-site dust sampling for PM_{10} and TSP to update the dust emissions inventory.	Completed. Report due Quarter 1 2007.
2005.11	Regularly report on ambient dust levels in Dampier and Karratha to the community.	Ongoing – reported through CCEF.
2005.12	Regularly advertise the availability of the Pilbara Iron 1800 LINK number in local print media.	Completed. Arrangement made with Pilbara News to have a monthly advertisement.
2005.13	Assess recommendations from external study on dust suppression options for the East Intercourse Island stockyards, and implement options where feasible	Projects identified. To be progressed during current upgrade.

The 2007 review of the Dust Management Plan and annual assessment of the Dust Improvement Plan will include consideration of the following strategies which have been highlighted as a result of the dust assessment work undertaken for the 145 Mtpa upgrade:

- Establishment of data collection and management systems that provide an audit trail of the implementation of dust controls leading to publicly reported performance indicators (water application times and volumes, water truck tracking etc.);
- Improve external reporting of high dust events (e.g. CCEF)
- Improve record keeping for bulking activities;
- Establish visual dust surveillance system;
- Wind shielding of dusty sources; and
- Perimeter tree areas to enhance dust deposition.

6.5.7 Dust Management Review

Environmental Resources Management Australia Pty Ltd (ERM) undertook a review and benchmarking study during 2006 of the current dust management practices at the Pilbara Iron Coastal Operations (i.e. Pilbara Iron Port Operations, including Dampier). The study concluded that "Pilbara Iron Port Operations have in place a dust management system that has all the elements to be considered Best Practice in this area (e.g. measurement techniques for the assessment of particulate matter). This finding is based on the assumption that Pilbara Iron Port Operations will ensure that all dust management initiatives outlined in the current Dust Management Plans and as part of the port expansion process are implemented" (ERM 2006).

However, whilst dust management was seen to be in the top range of dust management systems at comparable sites within Australia, areas for further improvement were identified and the need for efforts to be focused on ensuring that the current dust suppression systems in the stockpile areas and on the conveyors are functioning as effectively as possible.

6.5.8 Monitoring

Continuous ambient monitoring is the best way to determine actual levels of dust at sensitive locations. The extent of the Dampier monitoring network has been progressively upgraded over the last three years and will continued to be upgraded for the 145 Mtpa capacity increase.

Hamersley Iron proposes to further enhance the ambient dust monitoring network with the intent of achieving a 'World's Best Practice" real time dust monitoring network. The network rationale is to have an outer ring of monitors (TEOMS) that will be used for compliance monitoring and an inner ring of portable monitors strategically placed closer to, and throughout, the operational areas to provide site personnel with an early warning system and improved detail of site emissions sources. **Figure 6.10** presents the sites of the current and proposed dust monitoring stations. Three additional TEOM stations are proposed for installation in Dampier during 2007.

The reliability of the dust monitoring network will be substantially improved. An increased inventory of critical spare parts will be stored in the north west, so as to facilitate immediate

replacement, if required. The frequency of maintenance visits for the monitoring equipment will be improved from quarterly to monthly.

Outer Ring Monitors

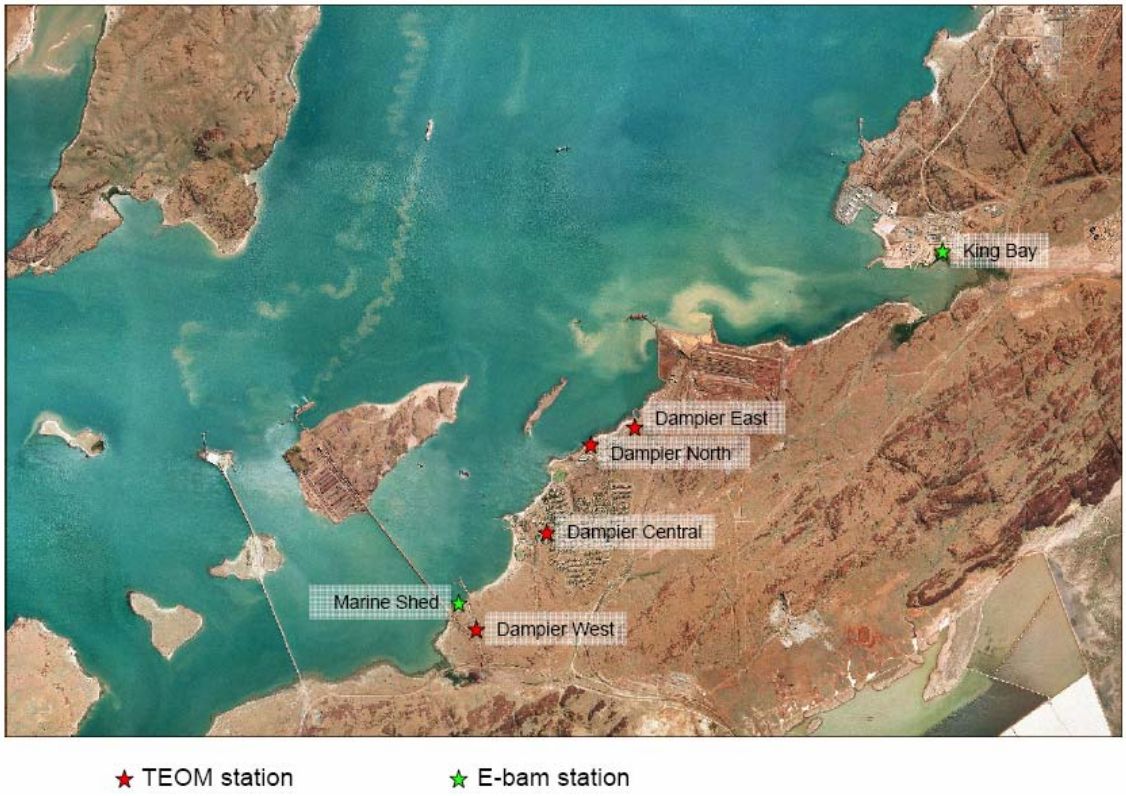
The "outer ring" monitoring network currently comprises the monitoring stations at the Dampier Primary School, King Bay and Karratha.

All existing TEOM monitors that measure PM_{10} at Dampier will be upgraded so that measurements will exclude contributions from semi-volatiles. In Hamersley Iron's case, these are generally in the form of salty air with a high moisture content which leads to a negative and false positive concentration peaks under certain weather conditions. This will be achieved by operating two PM_{10} TEOMs at the site simultaneously, one with a FDMS inlet treatment unit, the other without.

The Dampier Primary School site will be fully re-furbished with a new shelter and upgraded to allow for the collection of dust samples for future speciation.

One new TEOM will replace the existing E-BAM at the East Intercourse Island marine workshop. It is anticipated that another TEOM will be located in the northern portion of the Dampier township where residential dust impacts are predicted to be the highest.

The King bay site will continue to be monitored using the existing E-BAM currently operating there. All sites with multiple monitors will be upgraded to include new walk-in shelter with additional component redundancy to reduce downtime and improve data recovery.



- **Figure 6.10 - Location map displaying sites of current and proposed dust monitors.**

Ambient dust levels and local meteorological conditions from the outer ring network will be provided to Hamersley Iron and the local community in real time via the Pilbara Iron website.

Inner Ring Monitors

Supporting the *Outer Ring Monitors* will be a new network of E-scans (nepholometer style monitoring units). These systems are equivalent to the Osiris and Grimm units used at other mine sites across Australia, but have been identified as more suitable to continuous operation in Pilbara conditions. Nine of these units are being fabricated for installation across the Dampier region during 2007. At least three of these units will be located in Hamersley Iron's operational areas at East Intercourse Island and Parker Point. These systems will be developed to provide early warning alarms of elevated dust levels as close to the source as practicable. The remaining units are to be distributed throughout Dampier, with their exact locations to be determined from community input. Because the units are solar powered and built onto a portable concrete base, there is significant flexibility in their placement.

These monitoring systems will also continue to be supported by the dust deposition and gloss monitoring networks.

6.6 Noise

6.6.1 Management Objective

To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards.

6.6.2 Noise Modelling

The impact of noise emission from fixed plant operation was assessed by SVT for the proposed increase to 145 Mtpa (refer to **Appendix C** for a copy of the report). The acoustic model was developed using the SoundPLAN noise modelling software, which is approved by the EPA for the purposes of environmental noise modelling.

As part of the environmental approval process for the expansion to 95 Mtpa (and then 120 Mtpa), noise modelling assessments were undertaken by SVT for various meteorological conditions to predict Hamersley Iron's contribution to ambient noise levels within Dampier under the current and proposed operating conditions. This model has also been used to predict worst-case noise levels at noise sensitive locations at the town site of Dampier for the upgraded plant in order to achieve the proposed 145 Mtpa throughput.

The noise impact assessment undertaken by SVT is based on as built noise measurements taken during the commissioning of the 120 Mtpa upgrade project in December 2006. Since most of the plant and equipment already installed will also be used to achieve the increase in throughput to 145 Mtpa, the noise model should give a very good indication of the expected noise emission from the plant.

In order to verify the model and assess the errors associated with the noise modelling, the predicted noise levels for the DPU Phase A (collectively referring to the 95 Mtpa and 120 Mtpa) were compared to actual noise measurements taken at strategic locations around the plant. Noise monitoring data collected in the town of Dampier was also used to verify the model. These verification measurements show the predicted level agrees with attended measurements to within -1.2 dB(A) to +3.2 dB(A). The average difference between attended measurements and predicted levels is 0.4 dB(A), with a standard deviation of 1.6 dB(A) (SVT 2006a).

6.6.3 Noise Criteria

Noise emissions from the current port facilities can be considered as consisting of two components: noise from fixed plant and noise from rail transport. Noise from fixed plant is regulated under the *Environmental Protection (Noise) Regulations 1997.* However, rail noise is specifically excluded from these Regulations and, although there are some guidelines, there are currently no firm limits

that apply to rail noise in Western Australia. Therefore, noise from fixed plant and noise from rail operations has been assessed separately.

6.6.3.1 Criteria for Fixed Plant

Noise management in Western Australia is implemented through the *Environmental Protection (Noise) Regulations 1997,* which operate under the *Environmental Protection Act 1986*. The Regulations specify maximum noise levels (assigned levels) which are the highest noise levels that can be received at noise-sensitive premises, commercial and industrial premises.

Assigned noise levels have been set differently for noise sensitive premises, commercial premises, and industrial premises. For noise sensitive premises, e.g. residences, an "influencing factor" is incorporated into the assigned noise levels.

For noise sensitive residences, the time of day also affects the assigned levels.

The regulations define three types of assigned noise levels:

- $L_{A\ Max}$ assigned noise level means a noise level which is not to be exceeded at any time;
- $L_{A\ 1}$ assigned noise level which is not to be exceeded for more than 1% of the time; and
- $L_{A\ 10}$ assigned noise level which is not to be exceeded for more than 10% of the time.

The L_{A10} noise limit is the most significant since this is representative of continuous noise emissions from the port operations.

Noise levels at the receiver are subject to penalty corrections if the noise exhibits intrusive or dominant characteristics, i.e. if the noise is impulsive, tonal, or modulated. That is, the measured or predicted noise levels are adjusted and the adjusted noise levels must comply with the assigned noise levels. Regulation 9 sets out objective tests to assess whether the noise is taken to be free of these characteristics. Noise measurements recorded in the town of Dampier show no evidence of tonality, modulation or impulsiveness and therefore no penalties apply to the assigned noise levels.

The town of Dampier is predominantly a noise sensitive residential area and so the noise limits presented in **Table 6-19** apply.

■ **Table 6-19 - Assigned Noise Levels at Nearest Residences**

Time of Day	Type of Assigned Noise Level		
	L_{A10}	L_{A1}	$L_{A\ Max}$
0700 – 1900 hours – Monday to Saturday	45dB(A)	55dB(A)	65dB(A)
0900 – 1900 hours – Sunday and Public Holidays	40dB(A)	50dB(A)	65dB(A)
1900 – 2200 hours – All Days	40dB(A)	50dB(A)	55dB(A)
2200 – 0700 hours – Monday to Saturday and 2200 – 0900 hours – Sunday and Public Holidays	35dB(A)	45dB(A)	55dB(A)

Note: some residential locations close to Hamersley Iron's boundaries or to the commercial centre in Dampier may have slightly higher noise limits due to the application of an influencing factor.

Since the port facilities at Dampier operate on a 24 hour basis, the most stringent noise limit is 35 dB(A).

6.6.3.2 Criteria for Rail Operations

There are currently no firm limits that apply to rail noise in Western Australia. However, the Western Australian Planning Commission has issued a Draft Statement of Planning Policy: Road and Rail Transport Noise and the EPA has issued a draft statement for environmental impact assessment (No.14, Version 3) entitled "Road and Rail Transportation Noise" which addresses noise emission from new rail infrastructure. The Draft Statement of Planning Policy recommends a LAeq and LASmax exposure levels for various noise sensitive land uses next to rail and road transport corridors (refer to **Table 6-20**).

■ **Table 6-20 - Draft Recommended Noise Levels for Noise Sensitive Land Uses Next to Rail and Road Transport Corridors**

Time Period	Exposure level 1 (Target)	Exposure level 2	Exposure level 3
Day 6.00am – 10.00pm	Less than LAeq of 55	LAeq between 55 -60	Above an LAeq of 60
Night 10.00pm – 6.00am	Less than LAeq of 50	LAeq between 50 -55	Above an LAeq of 55
Additional criteria for railways	Less than LAS Max of 75	LAS Max between 75-80	Above an LAS Max 80
Recommendations made by draft policy	No additional action is required under this policy in relation to the management or amelioration of transport noise	Acceptable for residential and other noise-sensitive development, subject to appropriate measures to ameliorate noise impact	Not generally regarded as acceptable for conventional residential or other noise sensitive development

6.6.4 Plant Noise

The plant and equipment to be used for the 145 Mtpa throughput is the same as that installed for the 95 Mtpa and 120 Mtpa plant. Typical high noise sources from the existing and upgraded port operations include:

- Conveyors;
- Conveyor drive / transfer stations;
- Screen house;
- Dust collector; and
- Car Dumpers.

The highest noise contributors from the increase in throughput to 145 Mtpa are expected to be due to noise emissions from conveyor idlers and from conveyor drives.

6.6.5 Potential Impacts

The assessment by SVT (2006, 2007) shows that for the worst case modelling scenario (i.e. based on 100% plant utilisation, including the power station, and a northerly wind of 3 m/s and 2°C/100 m inversion) the noise emission from the 145 Mtpa operation is on average 50.5 dB(A) without bulking occurring, and 50.7 dB(A) with bulking occurring **(Table 6-21**). Previously, the throughput capacity of 120 Mtpa has been achieved at Dampier through the use of CD1 in combination with CD3. Since CD4 has become available for operations (and CD1 has ceased being operational and decommissioned), 120 Mtpa throughput will be achievable using CD3 and CD4 in combination. Noise levels associated with each of these operational combinations for 120 Mtpa are marginally different (refer **Table 6-21**). The utilisation of CD3 and CD4 will also enable 145 Mtpa to be achieved.

- **Table 6-21 - Maximum L_{A10} noise emission levels based on plant utilisation in dB(A).**

Description	Average noise levels taking into account plant utilization in dB(A)			
	80 Mtpa	95 Mtpa /120 Mtpa	120 Mtpa	145 Mtpa
Overall plant noise levels				
Excluding bulking	49.0	50.3	50.5	50.5
Including bulking		50.4	50.7	50.7

The maximum noise emission from the 145 Mtpa case when bulking is not being undertaken is:

- The same as the 120 Mtpa with CD3 and CD4 operating case (this is because the same plant is used by both the 120 Mtpa with CD3 and CD4 operating and the 145 Mtpa case);

- Greater than the 95 Mtpa/120 Mtpa with CD1 and CD3 operating case by 0.2 dB; and
- Greater than the original 80 Mtpa plant by 1.5 dB.

When bulking is being undertaken, the maximum noise emission levels increase by 1.7 dB for the 145 Mtpa case when compared with the original plant. Previous assessments have indicated that the maximum noise levels would decrease with the 145 Mtpa case, however, recent site noise verification measurements indicate that noise emission from the conveyors and conveyor drives is higher than originally anticipated.

To account for how the plant operates a noise emission assessment has been undertaken which incorporates how the plant is utilised (i.e. what plant is running at any given time). Based on this assessment the **Table 6-22** presents the average noise levels for the worst case wind conditions taking into account plant utilisation (including the power station) for the 80 Mtpa (original plant) 95 Mtpa, 120 Mtpa with CD1 and CD3 operating, 120 Mtpa with CD3 and CD4 operating, and 145 Mtpa cases.

- **Table 6-22 - Average L_{A10} noise levels at Dampier from plant at Parker Point based on plant utilisation (includes power station noise emissions).**

Description	Average noise levels taking into account plant utilization in dB(A)				
	80 Mtpa	95 Mtpa	120 Mtpa		145 Mtpa
			CD1 and CD3 Operating	CD3 and CD4 operating	
Excluding bulking	48.2	48.5	49.8	47.8	48.3
Including bulking		48.6	49.8	47.8	48.4

Taking into account plant utilisation, and excluding bulking activities, noise emission from 145 Mtpa upgrade is expected to be:

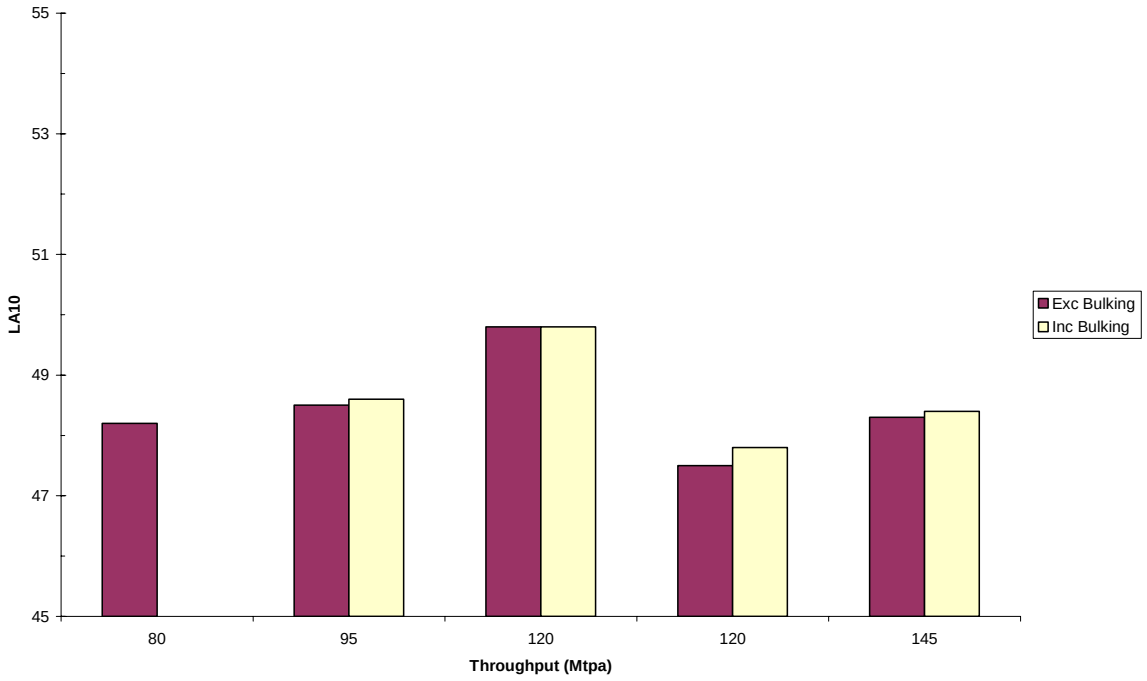
- 0.5 dB louder than the 120 Mtpa with CD3 and CD4 operating case;
- 1.5 dB quieter than the 120 Mtpa with CD1 and CD3 operating case;
- 0.2 dB quieter than the 95 Mtpa case; and
- 0.1 dB louder than the 80 Mtpa (original plant case).

When bulking is being undertaken, the 145 Mtpa case is expected to be:

- 0.6 dB louder than the 120 Mtpa with CD3 and CD4 operating case:
- 1.4 dB quieter than the 120 Mtpa with CD1 and CD3 operating case; and
- 0.2 dB quieter than the 95 Mtpa.

Figure 6.11 which provides a graph of L_{A10} noise levels within Dampier predicted for the various throughputs, demonstrates increasing noise levels for the original plant (80 Mtpa) through to 120

Mtpa (with CD1 and CD3 operating) due to a corresponding increase in utilisation of CD1. With CD4 being commissioned and CD1 being decommissioned, predicted noise levels decrease and marginally increase for the 145 Mtpa throughput case. However, predicted L_{A10} noise levels within Dampier are less for 145 Mtpa than for 95 Mtpa case.



- **Figure 6.11 – Predicted L_{A10} noise levels within Dampier for various throughputs.**

High noise emission from the plant is primarily due to higher than anticipated conveyor idler noise due to wax from the conveyor belt being deposited on the idler casing. All conveyor belts contain some wax as part of its rubber formulation: it is not possible to purchase conveyor belts from a commercial supplier that do not have some level of wax, as the wax is an important component of the manufacturing and belt preservation process. When the wax falls off the idlers during the course of the conveyors being used, the noise from the conveyor idlers should reduce by 3 to 8 dB. If the conveyors achieve a 3 dB noise reduction with the time, then the overall noise emission from the plant will reduce by 1.3 dB.

Pilbara Iron's main supplier of conveyor belts was recently requested to review the potential to eliminate wax from supplied belts. The supplier has successfully reduced the volume of wax to the minimum. Replacement belts will therefore have a reduced level of wax, a decrease in wax build up and noise is therefore anticipated.

The assessment shows that noise from the 145 Mtpa upgraded plant can exceed the day, evening and night time assigned noise levels under the Environmental Protection (noise) Regulations 1997 by the following amounts when there is a northerly wind:

- Day - 3.3 without bulking, and 3.4 dB(A) with bulking
- Evening- 8.3 dB without bulking, and 8.4 dB(A) with bulking
- Night time- 13.3 dB without bulking, and 13.4 dB(A) with bulking.

It should be noted that for Dampier the noise impacts are greatest when winds are from the northern quadrant and when the wind is calm. During night time hours, (when noise limits are most stringent), the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for 7.1% of the time each year. During the winter and spring months (when residents are less likely to use their air-conditioning) the worst-case conditions for noise impacting Dampier from the Parker Point facility occur for 6.2% of time.

6.6.6 Rail Noise

With the upgrade from 95Mtpa/120 Mtpa to 145 Mtpa, locomotives are not used continuously to index the train through the new car dumpers. Hence the upgrade will significantly remove the time and therefore the noise generated from locomotives operating along the track adjacent to Dampier.

To ensure that the assumptions made for the 120 Mtpa assessment remain the same, significant work has been undertaken to investigate and reduce noise from the brake cars used for the train unloading. Hamersley Iron has been aware of the potential of high squealing noise from the brakes of the new compressor brake cars that are used during the unloading of the trains. To ensure that the squeal noise does not become an annoyance, the following work has been undertaken:

- Investigating the cause of the high brake noise squeal;
- Applying damping treatments to the brakes;
- Installing rubber backing to the brake pads; and
- Reviewing brake pad material.

The noise treatments installed have now reduced the brake car squeal which was previously clearly audible at Lawson Drive in the town of Dampier.

With the increase in throughput from 120 Mtpa to 145 Mtpa there will be an increase in the number of trains per day from approximately 9 to 11, and the potential for increased noise (**Table 6-23**). The train assessment assumed that the number of trains arriving at Parker Point is on average evenly distributed throughout the day, and hence the day time and night time LAeq are the same value.

- **Table 6-23 - Train noise emission levels**

Train activity	95 Mtpa		120 Mtpa		145 Mtpa	
	Day time	Night time	Day time	Night time	Day time	Night time
	LAeq dB(A)		LAeq dB(A)		LAeq dB(A)	
Number of trains in use	6		9		11	
Total for train activities	34.3	34.3	34.6	34.6	34.2	34.2

Although there is an increase in train movements going from Phase A (120 Mtpa) to Phase B (145 Mtpa) there is a reduction in the LAeq day and night time noise levels by 0.4 dB. This noise reduction is achieved because CD1 has become redundant, and hence the noise from idling locomotives used to push the ore cars into the dumper on the CD1 line has been eliminated. The trains using the new CD3 and CD4 lines do not use locomotives to position wagons during the unloading process.

To assess the train noise impact, the Draft Statement of Planning Policy: Road and Rail Transport Noise, prepared by the Western Australian Planning Commission (refer to **Table 6-20**) and the EPA draft statement for environmental impact assessment (No.14, Version 3) entitled "Road and Rail Transportation Noise" has been used.

The Western Australian Planning Commission draft statement of planning policy recommends a target LAeq day time level of 55 dB(A) and an LAeq night time level of 50 dB(A) for noise sensitive premises adjacent to rail corridors. The estimated day time and night time LAeq noise levels at the closest noise sensitive premises are well below those target noise levels.

The EPA draft statement for environmental impact assessment uses a Noise Amenity Rating (NAR) to determine acceptable noise levels for residential developments near to road or rail transportation routes. Noise emission from the train activities will meet the lowest noise amenity rating of N0, and hence is considered suitable for both residential or open space use.

6.6.7 Management Strategies

As there is an exceedence of the assigned noise levels (for the evening and night time), Hamersley Iron will continue the process for reviewing options for reducing noise levels from the plant as part of the Environmental Noise Management Plan (see **Appendix C.2**) commitments to reduce noise from the port facilities. Hamersley Iron aims to reduce noise emission from its Port facilities by applying noise control measures to existing noisy equipment and by purchasing quieter equipment in the future where it is practicable to do so. Hamersley Iron's noise control strategy consists of four broad elements:

1) Applying noise control treatments to existing high ranked noise equipment;

2) Replacing high noise equipment with low noise equipment;

3) Maintaining existing noise control treatments; and

4) Reducing rail noise.

Whilst all reasonable measures are being evaluated and, where practical, implemented in order to reduce noise emissions, Hamersley Iron has also applied for a statutory exemption to the assigned noise levels via the process described in Regulation 17 of the Noise regulations associated with the *Environmental Protection Act 1986*. This application will be progressed toward the end of 2007 once all anticipated construction and decommissioning works have been completed. Key initiatives undertaken to date, and those planned for the immediate future are given in **Table 6-24**.

- **Table 6-24 - Noise reduction initiatives implemented or planned to be implemented**

Noise Management Initiative
Implemented as part of 95 Mtpa upgrade (Phase A)
Low noise idlers fitted to all new conveyors that were identified as potential contributors to noise in Dampier
New transfer stations fitted with low noise conveyor drives
New car dumper fully enclosed and fitted with low noise dust extraction system
Acoustic barrier fitted to new screen house to reduce noise to town of Dampier
Implemented as part of the current programme(Phase B) to replace car dumper, screen house and ship loader
Low noise idlers fitted to all conveyors that were assessed to represent a risk of contributing to increased noise levels in town of Dampier
Replacement of noisy idlers with low noise idlers on the 5E conveyor leading to East Intercourse Island
Use of low speed (6 pole) motors as against high speed (4 pole) motors for all conveyor drives
Acoustic barrier fitted to replacement screen house SH3P to reduce noise to town of Dampier
Silencer fitted to dust collector discharge stack for replacement car dumper and screen house
Use of low noise motors for car dumper positioner
Low noise braking fitted to replacement car dumper compressor and brake cars.
Replacement car dumper fully enclosed and fitted with low noise dust extraction system
Reduced conveyor start up alarm durations.
Application of damping treatment to compressor rail brake car wheels and the installation of rubber behind the brake pads to eliminate screeching noise from the operation of the rail brake car at Parker Point during rail wagon unloading
Removal of locos pushing cars into dumper and empty wagon shunting noise when CD1 is decommissioned.
Implemented as part of Environmental Noise Improvement Plan
Form an environmental noise working group to oversee environmental noise issues
Review the feasibility of implementing noise control treatments for existing plant items identified as significant noise contributors
Undertake regular environmental noise monitoring
Install permanent real time noise monitor within town of Dampier
Reduction in alarm noise levels to minimise alarm noise impact on the town of Dampier

In addition to the above initiatives, Port operations are evaluating the following noise mitigation initiatives:

- Reducing alarm noise levels to minimise alarm noise impact on the town when they are in operation;
- Trialling the use of a new type of vehicle reversing alarm that automatically emits noise marginally (about 5 dB) above background levels, regardless of time of day or night;
- Reducing conveyor start up alarm durations.

The above initiatives have been targeted in part as a result of the views expressed in the Dust and Noise Community Survey conducted in 2006 (refer **Section 4.3.2**).

The Dampier Port Operations have developed a comprehensive Noise Improvement Plan. The plan includes a further 31 action items for the 2006-2007 operating period, identified during a recent review of noise risks. The action items, with timeframe for completion and current status are listed in **Table 6-25**. This plan has been previously reviewed by the DEC and has since been incorporated into the revised Environmental Noise Management Plan.

Table 6-25 Noise Improvement Programme 2005 - 2006

Objective	Item No	Action	Target completion date
1. Model Validation			
Verify the 95 Mtpa noise modelling (Requirement of ministerial condition)	1	Take as built noise measurements for the new equipment added at PP for the 95 Mtpa capacity upgraded plant, and update the existing model and verify its accuracy. The initial noise measurements taken for the noise modelling and verification assessment were completed in November 2006. Retake noise measurements for all identified high noise equipment, and update verification assessment	Initial model completed Nov 06 Completed Jan 07
Assess noise from new equipment added at PP for the 95 Mtpa capacity upgraded plant in isolation from the existing plant (Requirement of Ministerial Statement)	2	Model the new equipment added at PP for the 95 Mtpa capacity upgraded plant in isolation from the existing plant based on as built noise measurements	Work completed in Nov 06
2. Specific Reduction Projects			
Improve Management of Environmental Noise	3	Install and assess the effectiveness of ambient noise level sensing reversing alarms on cars	Completed Jan 07
Improve Management of Environmental Noise	4	Install ambient noise level sensing reversing alarms on all company fleet cars that are taken into towns	All Light vehicles by July 2007
Improve Management of Environmental Noise	5	Reduce conveyor siren start-up noise impact by reducing the duration that the alarm is operated.	Completed Jan 07
Improve Management of Environmental Noise	6	Assess the duration of the conveyor siren start-up time (compare before and after change)	July 07
Reduce environmental noise from existing plant	7	Review to determine if the existing siren's frequency can be raised, whilst still providing adequate audibility within the plant area. (By raising the siren's noise emission frequency, noise from the sirens will become less audible within the town site.)	July 07
Reduce environmental noise from existing plant	8	Install low noise idlers on 5E and other conveyors	Completed November 06
Reduce environmental noise from existing plant	9	Undertake a review of noise from the Port Upgrade Projects new brake car to ensure that the noise control treatments implemented are sustainable.	Ongoing

Objective	Item No	Action	Target completion date
Investigate noise reduction measures for new conveyor drives with noise levels over 85 dB(A) at one metre	10	Contact drive vendors to discuss what noise control treatments that they can recommend to reduce noise levels. Incorporate the findings of the sound intensity measurements with the noise level results.	May 07
Investigate the opportunity for reducing noise levels from conveyor idlers	11	Monitor and improve the performance of the belt scrappers	Ongoing
Investigate the opportunity for reducing noise levels from conveyor idlers	12	Start technical discussions with belt suppliers on opportunities to reduce the amount of wax being included in conveyor belts.	Completed Jan 07
Investigate the opportunity for reducing noise levels from conveyor idlers	13	Investigate noisy idler frames, and develop treatments to stop the frames rocking (hence reduce noise from the frames)	Dec 07
3. Monitoring/Investigation/Systems			
Improve Management of Environmental Noise	14	Review the procedures to control high noise maintenance activities.	Ongoing
Improve Management of Environmental Noise	15	For equipment and plant being purchased or modified review the procedures and implementation system being used for the buy quiet process	Ongoing
Improve Management of Environmental Noise	16	Install second permanent noise monitoring station Select south west location in Dampier for second monitoring station	Q4 07
Improve Management of Environmental Noise	17	Develop a procedure to review and disseminate the permanent noise monitoring data to PI personnel, and the community.	Q2 07
Improve Management of Environmental Noise	18	Include check box for consideration of noise in Change Management Form	April 07
Take sound pressure level measurements for the new 5E low idlers and reassess the conveyors sound power levels	19	Take sound pressure level measurements for the new 5E low idlers and calculate sound power levels	Completed Dec 06
Repeat the sound pressure measurements taken for plant and equipment at EII's, and update both EII's sound power levels and noise model	20	Organise site visits to take noise measurements for plant and equipment at EII, and update sound power levels and noise model	April 07
Develop a noise control implementation program	21	Ensure the implementation program is incorporated in the business cycle planning for 2008.	July 07

Objective	Item No	Action	Target completion date
Undertake an annual review of the status of noise control treatments	22	As part of the annual environmental noise survey a review of the status of major noise control treatments (e.g. acoustic silencers, acoustic screens in place, etc) will be undertaken. This review will include a physical inspection of the treatments to ensure that they are still functioning	April 07
Undertake annual environmental noise monitoring	23	Undertake environmental noise monitoring survey following decommissioning of original plant at Parker Point	Dec 07
Reduce Environmental Noise from Rail Operations	24	Undertake detailed rail noise measurements to assess current noise emission levels from the current operations upon decommissioning of CD1.	Sept 07
Comply with the Environmental Protection (Noise) Regulations 1997	25	Determine whether PI needs to seek an exemption for noise emission	Commence by December 07. Complete documentation by March 2008
Investigate noise reduction measures for new conveyor drives with noise levels over 85 dB(A) at one metre	26	Undertake detailed sound intensity measurements to confirm the split in contribution from gearbox casing noise, gearbox cooling fan, coupling noise and motor generated noise are making to the overall noise levels. Use this information to identify possible noise reduction measures.	April 07
Reduce noise levels from conveyor idlers	27	Implement a noisy idler change out procedure – that includes a noise criterion for internal decision making for change-out of idlers.	Ongoing
Update the environmental noise register in the ENMP	28	Update noise register in the ENMP	Ongoing
4. Improvement Planning			
Improve Management of Environmental Noise	29	Review and revise the environmental noise awareness training module	April 07
Revise the potential noise control treatments options list	30	Revise the potential noise control improvement options list provided in Appendix F of the ENMP.	July 07
Assess the practicality of implementing the noise control options developed for the new conveyor drives	31	For each conveyor drive noise control treatment identified assess the practicability of the treatment based on cost, effectiveness, safety and sustainability.	July 07

6.6.8 Monitoring

Hamersley Iron will continue to undertake regular environmental noise monitoring within the Dampier Township to assess the compliance of the Port Operations with the *Environmental Protection (Noise) Regulations 1997*. A permanent environmental noise monitor has recently been

installed on the north side of Dampier town to monitor noise emission from the Parker Point facility, with another permanent noise monitor scheduled to be installed to the southwest of Dampier during 2007.

The environmental noise model prepared for the EPS report for the increase in throughput to 145 Mtpa that is provided in **Appendix C** will also be maintained and updated if any major changes to the plant and equipment occur.

6.7 Water Supply

6.7.1 Management Objective

Minimise the impact on natural water resources by minimising water consumption.

6.7.2 Water Balance Modelling

CyMod Systems (a water modelling consultant) was contracted to undertake water balance modelling of the Dampier Port. The increase in throughput was assessed using a Goldsim water balance model developed for the port by Hamersley Iron. The model had been calibrated using available water consumption data from January 2003 through to May 2006. The Goldsim model of the Dampier Port accounts for the variation in water usage as a function of ore type using a duty cycle parameter, which adjusts spray (and other water demand) running times for the car dumpers, based on the generic product types.

The scenario modelled included some basic improvements to the port infrastructure, which are summarised below:

East Intercourse Island

Whilst the East Intercourse Island port is not undergoing any increase in throughput, it is being modified to more effectively meet environmental requirements with respect to dust emissions. These changes include:

- Upgrading the 5E conveyor with a new top and one side cover (dust hoods and sprays were recently installed);
- Installing 136 cannons in the stockyard to bring the total to 140 (4 water cannons were previously installed);
- Installing boom water sprays and hose reelers on three reclaimers;
- Belt washer was installed on 5E conveyor;
- The capability to use chemical dust suppressants from existing stackers;
- The capability to use chemical dust suppressants from tanker stand pipes for application to unsealed roads; and

- Capacity to seal bulk stockpiles using water trucks and chemicals.

Parker Point

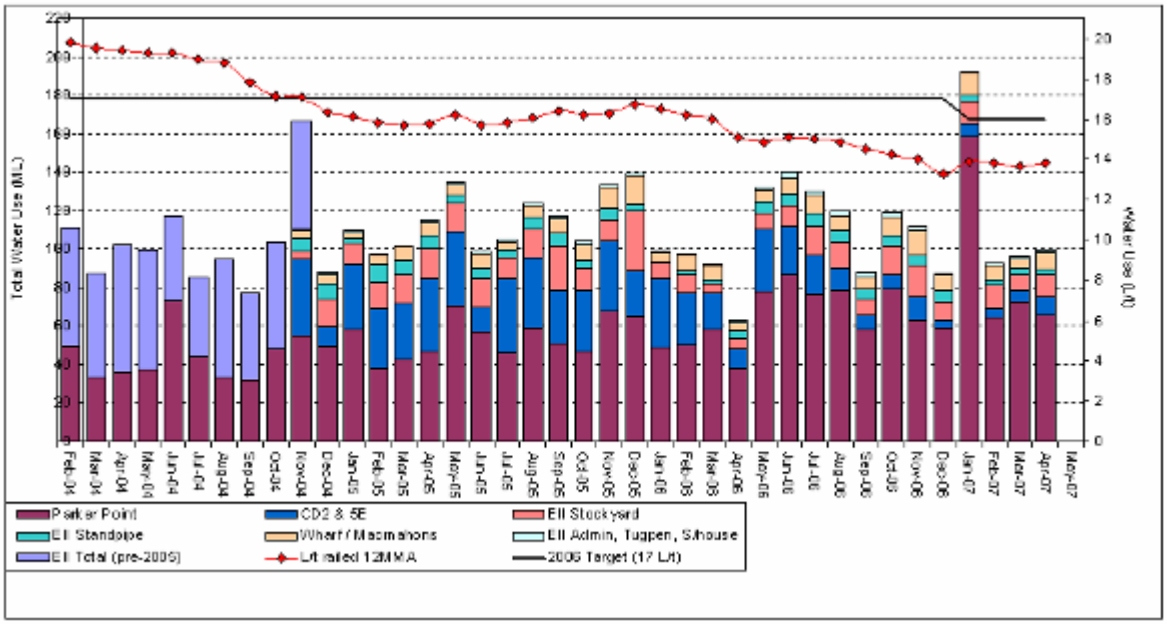
- Construction of Car Dumper 4 (CD4) as a replacement for Car Dumper 1 (CD1);
- Decommissioning of CD1;
- Construction of Screen House 3 (SH3P) as a replacement for Screen House 1 (SH1P);
- Decommissioning of SH1P;
- Installation of Ship Loader 3 (SL3P) as a replacement for Ship Loader 1 (SL1P);
- Decommissioning of SL1P;
- Removing all of the original conveyors and replacing them with wider, slower conveyors;
- New wharf conveyors; and
- An additional 174 stockyard cannons (bringing the total to 221 cannons).

6.7.3 Existing Conditions

Water for the existing operations is purchased from the Water Corporation. Hamersley Iron communicates regularly with Water Corporation regarding the expected demands from the West Pilbara Water Supply Scheme. Hamersley Iron is party to the Water Demand Stakeholders meeting with all users on the scheme. Hamersley Iron has contributed its operational input to the Water Corporation planning process, which Water Corporation have combined with other users and their own township growth predictions to define the scheme capacities and improvement budgets.

The water provided to the port operations is sourced by Water Corporation from the Harding Dam with Millstream Aquifer available as the contingency supply. In order to prevent product contamination, water applied needs to be of a good quality, limiting the sources of water available.

Figure 6.12 illustrates that there has been a steady decline in the litres of water used per tonne of ore received since February 2004.

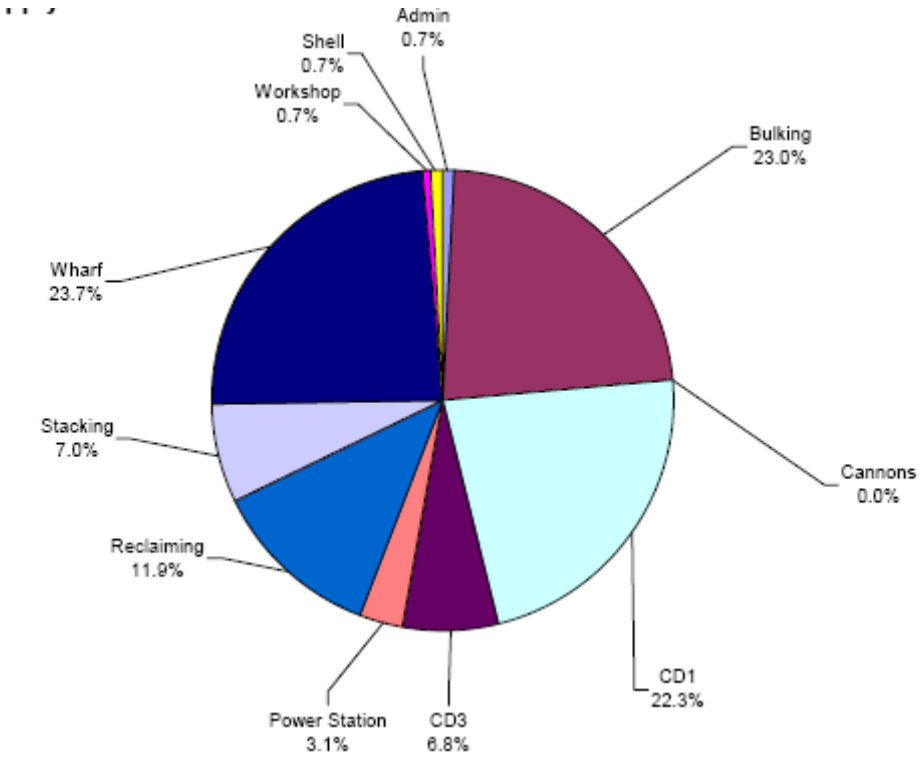


- **Figure 6.12 - Water consumption per tonne of ore received since February 2004.**

A total of 1,316 ML of water was used at Dampier in the 2005/06 financial year with 14.68 L used per tonne. The water use during 2005/06 was assisted by the wet start to 2006 with several cyclones reducing dust suppression needs. **Figure 6.13** shows a typical break-up of where the water is used at Parker Point. The throughput at the Dampier Port for the same period was approximately 90 Mt.

Dampier town and Pilbara Rail currently use approximately 750 ML pa combined, which is unlikely to change with the increase in throughput to 120 Mtpa and the proposed 145 Mtpa.

Once production reaches 120 Mtpa, water consumption is expected to be around 2,160 ML pa.



- **Figure 6.13 - Dampier Port Operations – Parker Point potable water balance for 2005/2006 (Note: cannons not installed at Parker Point at that time).**

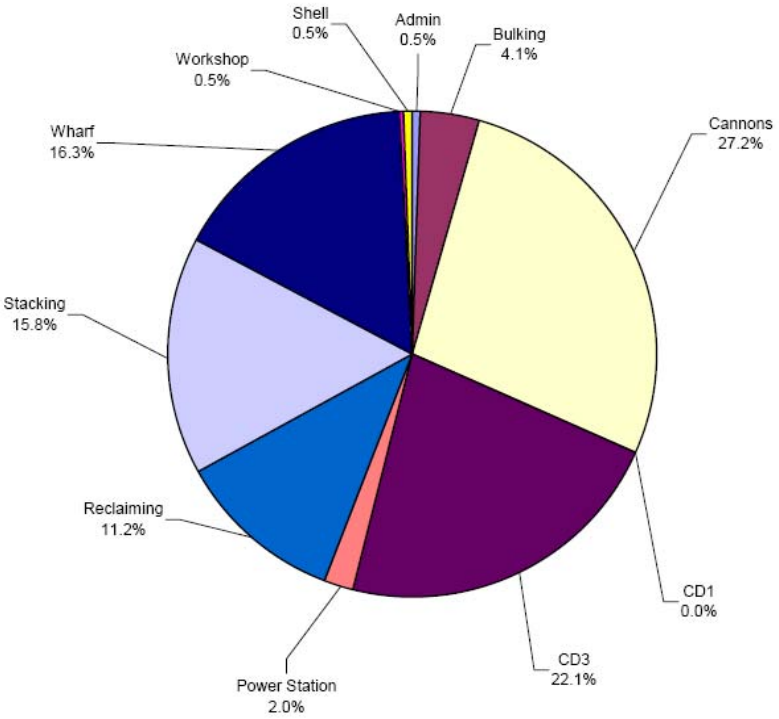
6.7.4 145 Mtpa Upgrade

Once production reaches 145 Mtpa, water consumption is expected to be approximately 2,520 ML pa (**Table 6-26**).

- **Table 6-26 - Predicted potable water consumption for the Dampier Port for a 145 Mtpa throughput**

	Tonnage (Mt)	Usage (kL/annum)	Water Efficiency (L/t)
EII	45	1,180,000	26.2
Parker Point	100	1,340,000	13.4
Total	145	2,520,000	17.3

The majority of the water use is for dust suppression works, which are necessary to ensure that dust concentrations within the town of Dampier are acceptable (**Figure 6.14**)



- **Figure 6.14 - Dampier Port Operations – Parker Point predicted potable water balance 2009**

6.7.5 Potential Impacts

Hamersley Iron recognises that with the low rainfall in the Central Pilbara in recent years, there is limited water available in the Dampier area and that an increase in water consumption by the operations may place a strain on water resources. It also recognises that in order to ensure that the increased throughput at the port does not result in an increase in ambient dust levels within Dampier, additional water will be required for dust suppression.

With the increase in throughput to 145 Mtpa, water consumption is predicted to increase by approximately 360 ML pa (**Table 6-27**). The majority of this increase is for dust suppression works (refer to **Section 6.2**).

The increase in consumption remains within Hamersley Iron's existing allocation and water efficiency (litres per tonne) is expected to improve compared to the current situation (**Table 6-27)**. The projected improvement in efficiency of water usage is primarily due to improved conveyor dust and spillage control by using wider/slower conveyors and the use of a dry dust collection system at the new car dumper and screen house (replacing CD1 and SH1P which used wet scrubbers) and the various water re-use and water minimisation programs in place.

■ **Table 6-27 - Projected Water Consumption for the Dampier Port Operations (Parker Point and East Intercourse Island)**

Water Usage	Projected Water Consumption			
	2004 (Actual)	95 Mtpa	120 Mtpa	145 Mtpa
Water use ML /a	1,500	1,700	2,160	2,520
Water use efficiency (L/t)	20.3	17.9	18.0	17.3

One of the possible uses of water is for dust suppression for winds orientated (200^{O} to 260^{O}) toward the industrial area in King Bay derived from the Parker Point stockpiles, in addition to that already committed for those winds in the direction of the town of Dampier. The calibrated water balance model was used to assess the effect on water consumption of different wind velocity criteria on dust suppression in the stockyard to mitigate impacts at King Bay. The modelling approach was to determine likely additional annual water consumption if water-based dust suppression was applied at Parker Point operations when the wind velocity in the direction of King Bay (200 to 260°) exceeds 20, 25 and 30 km/hr. Typically this occurs between 0 and 20 times per month, depending on the minimum wind velocity above which dust suppression methods are employed and the month. The statistical variation in projected water demand at Parker Point port is related to how often and for long dust suppression cannons and stacker/reclaimer boom sprays are used during high winds. The 95% percentile case represents an aggressive dust suppression regime, where cannons and sprays are run for longer periods for each exceedence of the wind velocity threshold.

Table 6-28 illustrates the impact on the predicted water consumption should the King Bay scenarios be required at the 95% aggressive dust control protocols. As expected, increases in water consumption are less for higher velocity thresholds.

Given that applying water to the Parker Point live stockpiles is predicted to result in a significant increase in annual water consumption, dust modelling was undertaken to determine the benefit from the cannons.

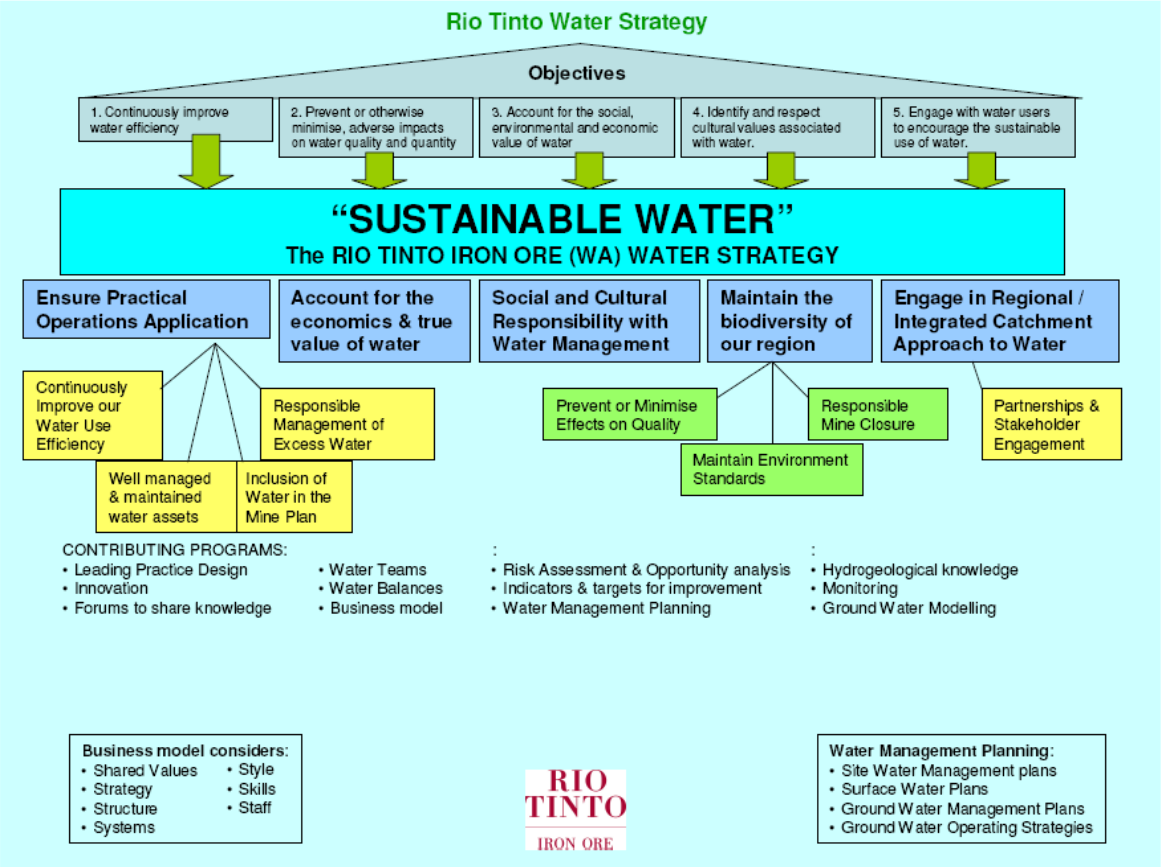
The objective of the water usage would be to control the high, short term dust events. The dust modelling demonstrated that the contribution that the Parker Point live stockpiles make to the annual average concentrations is very low. This is because for much of the time, the wind speed is below the threshold for dust lift-off. Similarly, the modelling results indicate that there is a very small (1.07%) dust reduction benefit to the 6^{th} highest 24-hour average concentration starting with a threshold velocity of 25 km/hr. This requires an extra water consumption of 998,000 kL, which is a large requirement relative to the benefit. Any use of the water cannon will have a short-term dust concentration reduction benefit, however, it appears that the 24-hour averages mask the shorter timescale benefits.

- **Table 6-28 - Summary of Simulation Results – East Intercourse Island and Parker Point including the 95% case for King Bay dust management scenarios**

Scenario	Site	Tonnage (Mt)	Base Case Usage (kL/annum)	Additional Scenario Usage (kL/annum)	Final Scenario Usage (kL/annum)	Water Efficiency (L/t)
Base Case	EII	45	1,180,000		1,180,000	26.2
	PP	100	1,340,000		1,340,000	13.4
	Total	**145**	**2,520,000**		**2,520,000**	**17.3**
> 30 km/hr	EII	45	1,180,000		1,180,000	26.2
	PP	100	1,340,000	521,000 less 345,000	1,516,000	15.2
	Total	**145**	**2,520,000**		**2,696,000**	**18.6**
> 25 km/hr	EII	45	1,180,000		1,180,000	26.2
	PP	100	1,340,000	998,000 less 345,000	1,993,000	19.9
	Total	**145**	**2,520,000**		**3,173,000**	**21.9**
> 20 km/hr	EII	45	1,180,000		1,180,000	26.2
	PP	100	1,340,000	1,580,000less 345,000	2,575,000	25.8
	Total	**145**	**2,520,000**		**3,755,000**	**25.9**

6.7.6 Management Strategies

Hamersley Iron is committed to reducing the consumption of water wherever possible. An excellence in Water Management diagnostic programme was commenced in June 2004 to identify opportunities to reduce freshwater consumption and improve water efficiency. Work is progressing on the projects identified in this review. Rio Tinto Iron Ore recently developed a Water Strategy (refer **Figure 6.15**) which was signed off by the Executive Committee in February 2007.



- **Figure 6.15 – Rio Tinto Iron Ore's Water Strategy.**

A Water Management Plan (WMP) has been developed for Dampier Operations which defines all aspects of water for the site in a single document. The WMP was developed as part of compliance with internal Rio Tinto requirements (under the Environmental Standard "Water Use & Quality") The objective of the plan is to identify existing water management practices which have been adopted on site with reference to the Pilbara Iron's Sustainability Development principles, Rio Tinto Environmental Standards in Water Use and Quality Control and Rio Tinto Water Strategy, and further identify opportunities for improvement to ensure compliance with the principles and standards. The plan was developed in consultation with site staff and represents the combined knowledge on the water resources and ecosystems in and around the site.

The plan includes the following information:

- Knowledge of the characteristics of surface and groundwater resources in which the operation works.
- Outcomes of risk assessments.

- An appropriate ‘site water balance’, including solute balances, detailing all water inputs, uses, outputs and losses.
- Targets to drive improvements in water management.
- Clear responsibilities and accountabilities for water management.
- Emergency preparedness and response procedures.
- Details of site monitoring programs.

The WMP consolidates the acquired knowledge about the water resources and ecosystems and the regulations and requirements of the pertinent authorities. The WMP will be reviewed at least every four years or more frequently when operational or environmental conditions so dictate. Currently this is annually as the document develops.

A range of dust suppression options were evaluated for the port upgrade to ensure that the dust suppression measures installed result in the most efficient use of resources, in particular water, i.e. to ensure water is not wasted controlling dust in areas that are not major contributors to ambient dust levels. A number of projects are planned or are underway that look at ways to reduce, recycle or reuse water for both the existing operations and the port upgrade (**Table 6-29**).

Table 6-29 - Water management initiatives for the Dampier Port Operations

Item	Activity	Status
Water Balance	Develop a water balance of Dampier Operations, which includes the installation of water meters at Parker Point, to better understand water usage and identify further opportunities for improved water efficiencies	Commenced in Q1 2006
Dry bag house systems rather than wet scrubbers	Installation of dry bag houses for dust collection in new and replacement car dumpers and screen houses at PP. Old wet scrubbers will be decommissioned as part of original plant (CD1, SH1P) decommissioning.	Being implemented as part of the port upgrade
Automatic Transfer Cleaning	Developing a system of automatically removing build up inside the mainline transfer at East Intercourse Island	Evaluation
Water leak identification and rectification program	Implement identification and repair of leaks in the water supply and delivery system, resulting in 126 leaks being identified and 106 leaks being repaired.	Ongoing
East Intercourse Island Car Dumper process water recycling for re-use	Modification of the existing agitator water supply strategy at the East Intercourse Island Car Dumper resulting in predicted 50% reduction in water use from this facility. Improved recycling of wash down water.	Being implemented
18E water and cleaning improvements	Use of dry brushes and scrapers to improve cleaning as trial	Trial completed
Apron feeder rubber walls	Live rubber walls installed to apron feeders to reduce build up requiring washdown	Being implemented
Low volume spray nozzle strategy	Replace existing water sprays that exhibit poor coverage and high volume water demand with water sprays that have good coverage and use low volumes (e.g. East Intercourse Island stacker boom sprays)	Implemented
High pressure water cleaners for spillage clean-up.	Purchase of two trailer mounted and two fixed high pressure low volume water sprays for clean up of spillage events (reduced water use compared to use of fixed water hose)	Implemented
Water efficient dust suppression	Dust reducing techniques evaluated to make sure that the most water efficient techniques are used.	Continuous – through Dust and Water Management Team and DPU Project Team
Dual water supply system at Parker Point	Implementation of a dual water supply system at Parker Point containing a system for potable (drinkable town) water and process water. This initiative also delivers better water pressure for more efficient washdown.	Operational
Parker Point Consolidated sediment and non-potable recycling facility	Installation of a consolidated concrete settlement pond at Parker Point that allows collected water to be pumped to a central process water tank for non-potable water use (e.g. water application from water cannons or water truck)	Implemented as part of the port upgrade
Improved product transfer	Improvements in design of transfer points will result	Implemented in all

Item	Activity	Status
design	in significant reduction in spillage and therefore reduced demand for washdown water	new plant at Parker Point, with specific transfer points that are prone to spillage at East Intercourse Island currently under evaluation to identify means of improvement
Re-use of water sourced from CD3, CD4, SH2P and SH3P	As part of port upgrade water from CD3, CD4, SH2P and SH3P is to be piped to the consolidated silt trap for re-cycling.	CD4 and SH3P being constructed, CD3 and SH2P operational. Consolidated sediment trap is completed.

In addition, there has been a new initiative in dust suppression to reduce water use. The average spray on-time for water cannons is defined as a stochastic variable, which is a function of the number of dust warnings per month. This variable was used to modify the likely running time of water sprays on days that have dust warnings, making water use for dust suppression more efficient.

6.7.7 Monitoring

The total amount of water used by the port operations is metered. To gain a better understanding of the use of water within different areas of the plant, a program is currently being planned which will result in a number of additional water meters installed at key points within the water system such as the water lines for the stockpile cannons and conveyor sprays. This program will feed into the water balance being developed for the site.

6.7.8 Water Efficiency

Currently the total water used is measured in order to assess performance against water usage targets. Hamersley Iron has set business wide targets, with all operations expected to contribute to the target achievement. Dampier Operations targets is based on achieving a 10% reduction in water used per tonne railed, based on 2003 achieved levels, by 2008. Parker Point contributes to the Dampier Operations target, and the site is achieving the target to date.

The business is currently defining the targets for the next period after 2008, being 2009 to 2013, which will be finalised by mid 2008. Current indications are that targets will include "freshwater use per tonne product" and "water recycled as a proportion of total water used". These will encourage water reuse and the use of lower quality water where available. The size of the targets (percent improvement) will not be set until mid 2008.

6.8 Marine Environment

6.8.1 Management Objective

Maintain the integrity, ecological functions and environmental values of the seabed and nearshore areas.

6.8.2 Potential Impacts

Ballast Water

Ballast water from coastal areas in other parts of Australia or overseas has the potential to introduce marine pest species that may impact upon the marine communities of Mermaid Sound and the wider Dampier Archipelago. Marine pest species can be transported within ballast water or on ship hulls. Large populations of marine pest species are capable of invading new ecosystems, disturbing the ecological balance of existing marine communities and potentially impacting on recreational and commercial fisheries and aquaculture.

Oil Spills

There is a potential risk that oil spills may occur in such events as a ship collision. Although this is unlikely, it may lead to the contamination of marine water within the vicinity of the spill and potential damage to intertidal marine habitats causing mortality of sensitive biota. Oil spills in the Dampier region have the potential to wash ashore into nearshore habitats of King Bay, Mermaid Sound and wider Dampier Archipelago due to the tidal nature of the region.

Dust and Particulates

Activities at the Dampier operations considered most likely to generate iron ore dust are the iron loading, handling and stockpiling operations. Marine deposition of dust may result with the particles settling first on the ocean's surface and then sinking and adding to the sediments on the ocean floor. The coarse fractions of dust will settle close to their source. Iron ore dust may also be present in runoff from wash-down and stormwater across the operations site. The environmental impact of elevated iron in the marine environment is generally considered to be minimal at the most commonly encountered sediment concentrations. The National Ocean Disposal Guidelines (EA 2002) do not specify a screening trigger for iron, and subsequently iron is not subject to toxicity testing.

The Dampier Operations implemented a dust management strategy that incorporates dust management and suppression measures, as well as ambient monitoring. This strategy is designed to reduce the potential for dust creation and impact on the environment. Operations also have a Marine Management Program which seeks to reconcile the need for environmental protection with the operations of the area as designated port facility adjacent to a centre of population. The Program establishes environmental values and environmental quality objectives for the marine

environment that may be impacted by operations, describes monitoring surveys, and provides a management framework to prevent or mitigate any identified environmental impacts.

The Dampier operations undertake environmental monitoring, including ambient dust levels and marine water quality on a continuous, routine and ad hoc basis.

Sediment sampling in the waters surrounding the Dampier operations have been undertaken periodically, typically associated with dredging programmes. No specific monitoring programmes have been conducted at Dampier with the aim of investigating the potential impact of dust from operations on the marine environment. Sampling adjacent to Parker Point and East Intercourse Island identified elevated levels of iron within the sediment however, it was noted that these levels were not extreme (twice to four times the background level). Similar elevated levels have been measured within Sam's Creek, adjacent to Cape Lambert (MScience 2005b), where these higher levels of iron did not appear to correspond to any change in the grain size of sediments that might suggest a predominance of fine clays or the presence of relatively coarse iron ore. Most of the sediment samples were composed predominantly of sands.

Fine particles such as likely to be deposited as airborne dust some hundreds of metres from dust sources would most likely fall into a size class that would settle very slowly in the water column and be dispersed over considerable areas of sea bottom. Thus reaching corals at lesser concentrations than they land on the water surface.

Some recent estimates of the mortality threshold for Dampier corals suggest that acute effects may occur at sedimentation rates in excess of 200 $mg/cm^2/d$. Air quality modelling (**Section 6.5.4** undertaken for the 145 Mtpa throughput predicts maximum monthly deposition rates at Dampier of about 0.5 g/m^2/month (or 0.0017 $mg/cm^2/d$). Indicating that airborne dust deposited on the sea surface is insignificant compared to that required to cause acute effects on corals.

Dust and sediment falling or washed from wharves may be of much greater impact potential - although at Dampier there is little coral immediately adjacent to wharves.

Turbidity levels in the waters at Dampier and surrounding area have been investigated as part of a dredging spoil disposal assessment. The data indicated that water clarity in the King Bay area is turbid and varies temporally, spatially and with depth in the water column. Local waters were found to be turbid with higher levels of turbidity in near shore areas (SKM 2006b).

Two principal mangals occur within the Hamersley Lease: to the east within King Bay and to the west of the East Intercourse Island causeway.

The King Bay mangal has been described as significant for the area (Astron 1996) and provides a popular target for recreational fishers in this area. The area is part of a larger mangal which

extends eastward across the upper King Bay area. This larger mangal was the subject of studies by the WA Department of Conservation and Environment in the 1980s when the main Burrup access road was constructed through its upper reaches (see Semeniuk *et. al*. 1982). During a comparison of aerial photography from 1957 and 2001 (MScience 2004a) it was clear that the distribution of individuals and species in the part of the mangal within Hamersley Lease had changed little over the intervening 44 years.

The mangal to the west of the East Intercourse Island causeway is less well known and anecdotal reports from previous Hamersley environmental personnel suggest that this area may have been impacted when an access road was constructed.

Mangroves generally have broad tolerances to environmental factors, experiencing rapid growth and maturity, continuous or almost continuous flowering and propagule production, high propagule outputs in a wide range of environmental conditions, and adaptations for short and long distance dispersal by tides (Cintron-Molero 1992). Mangrove colonisation has been noted in the Pilbara region. Mangroves are also sensitive and vulnerable to disturbance. One of the plant's most vulnerable components is the aerial root system (Odum *et. al.* 1982) being susceptible to clogging, prolonged flooding, and boring damage from invertebrates. Any process that coats the aerial roots with fine sediments or covers them with water for long periods has the potential to effect mangrove health. The potential ecological impact of airborne dust on mangroves in the Pilbara region has been investigated by a number of organisations.

A BHPBIO commissioned study (1995) on the impact of mangroves in the Port Hedland region found a lack a visible dust within the stomata of mangrove leaves when assessed through scanning electron microscopy. These leaves had been selected because of the visible layer of dust on the leaf surface. The findings refuted the theory that mangroves were impacted by the abrasiveness of iron ore dust particles, but suggested that restriction of transpiration may contribute to any observed tree health impacts.

Collaborative research projects between CSIRO and Murdoch University were designed to determine the impact of iron ore dust deposition on the photosynthetic performance and heat stress of mangroves. The results of the Murdoch study indicated that dust particles did not block mangrove leaf stomata, restrict transpiration or cause abrasion (Paling *et. al.* 2000).

A comparison of ambient dust levels for the Dampier area and the Port Hedland area indicates that dust levels in the vicinity of the mangroves in the King Bay are likely to be similar or less than those in the Port Hedland study area. On the basis that the mangroves throughout the Pilbara region respond similarly to the presence of iron ore dust, then it is assumed that potential impacts will be similar and that mangrove health is not being reduced by existing or predicted levels of iron ore dust.

6.8.3 Management Strategies

Potential environmental impacts will be minimised in accordance with the implementation of the following strategies:

- The Australian Quarantine and Inspection Service (AQIS) and Dampier Port Authority ensure that the Mandatory Ballast Water Management Arrangements and Dampier Port Authority Guidelines are followed. These Guidelines and Arrangements require (as a minimum):
  - Accurate reporting to AQIS regarding ballast water arrangements;
  - Mandatory access to safe onboard ballast sampling points;
  - If required, undertaking exchange and/or other treatment/management options as directed by AQIS prior to discharge of ballast water in Australian waters;
  - No discharge of ballast water within Australian water without prior written permission from a Quarantine Officer; and
  - Completion of an 'audit and advice procedure' as stated in the Port of Dampier Environmental Management Plan which ensures that the vessel has been accepted by AQIS, ballast water exchange has occurred at sea remote from coastal influences and a record of the time and position of re-ballasting is kept.
- Closely work with the Dampier Port Authority and participate in the implementation of the Port's '*Port of Dampier – Marine Pollution Contingency Plan*' that provides guidance for the management of marine oil spills.
- Hamersley Iron has prepared a Marine Management Plan in compliance with Ministerial Statement 638. A component of the plan is an Oil Spill Contingency Plan which has been approved by the Dampier Port Authority. The objective of the Plan is to "*Establish, test and maintain an effective response to emergency situations resulting from spills of oil or other water dispersed chemicals*."
- The Marine Management Plan also identifies:
  - What environmental values are relevant;
  - Environmental Quality Objectives; and
  - Measurable criteria which will allow Hamersley Iron to assess and demonstrate that Environmental Quality Objectives are being met.

6.8.4 Monitoring

Hamersley Iron currently monitors a range of potential contaminants under the DEC licences which cover the Dampier Port Operations. The Marine Management Plan outlines an extensive monitoring program which is being implemented.

6.9 Greenhouse Gas Emissions

6.9.1 Management Objective

To minimise emissions to levels as low as practicable on an ongoing basis and consider offsets to further reduce cumulative emissions.

6.9.2 Potential Impacts

After the construction works have been completed and the port is operating at the increased throughput of 145 Mtpa, the greenhouse gas emissions from the Dampier operations are expected to increase, as the increased tonnage being processed through the port will require additional power to be generated and additional fuel usage.

Annual greenhouse emissions from the Dampier port operations when operating at 145 Mtpa are estimated to be 129,251 t CO_2 –e. This estimate includes emissions from electricity use, diesel fuel consumption, wastewater and solid waste production (**Table 6-30**). The two significant sources of greenhouse gas emissions are electricity use and diesel fuel combustion, emitting 115,468 and 13,356 t CO_2 –e or 89.3% and 10.3% of total greenhouse gas emissions respectively (refer to **Appendix D.1** for details).

- **Table 6-30 - Historical Emissions Summary - Dampier Port Operations**

Year	Total Greenhouse Gas Emissions (tCO_2 -e)	Dampier Port Railed Tonnes Received (Mtpa)	Total Emissions per Railed Tonne Received (kg CO_2 -e/t)
2001	59,878	69.0	0.87
2002	65,990	69.5	0.95
2003	66,908	71.1	0.94
2004	72,965	73.9	0.99
2005	82,602	82.9	1.00
145 Mtpa	**129,251**	**145.0**	**0.89**

(SKM, 2006)

The emissions per tonne of ore shipped are expected decrease from 1.00 kg CO_2-e per tonne of ore shipped (2005 emissions) to 0.89 kg CO_2-e per tonne of ore shipped. Given that the 129,251 t CO_2 –e estimated for Dampier at full production is generated as a worst case scenario, the actual emissions recorded are likely to be less than the estimate.

Whilst the increased tonnage to be processed will require additional power to be supplied from the existing gas fired power station, the greenhouse gas emissions from the power station will remain the same. No additional power will be generated by the power station, rather there will be a reallocation of power from existing users, with the overall greenhouse gas production remaining unchanged.

6.9.3 Management Strategies

The EPA has developed a Guidance Statement that specifically addresses the minimisation of greenhouse gas emissions from significant new or expanding operations (EPA, 2002). The greenhouse gas estimations presented have been calculated using approved methodologies, and Hamersley Iron's management strategies are aligned with the objective of this Guidance Statement, to reduce emissions to a level which is as low as practicable.

Hamersley Iron supports the need to act now to restrict emissions of greenhouse gases. Hamersley Iron's present response has been to concentrate on improving efficiency of energy use (which is the major source of emissions). In 2002, a detailed inventory of emissions matched against production was produced to track any improvements and target new initiatives. These relationships will form the foundations for setting more relevant emission targets and developing initiatives to reduce emissions from significant sources.

In accordance with EPA Guidance Statement 12 (EPA, 2002) Hamersley Iron has developed a Greenhouse Gas Management Plan (see **Appendix D.2**) for the proposal to increase throughput to 145 Mtpa. The objective of the plan is to ensure that potential greenhouse gas emissions are adequately addressed. As such the plan addresses:

- Greenhouse gas emissions inventory and benchmarking;
- Measures to minimise greenhouse gas emissions;
- Carbon sequestration; and
- Minimising emissions over the life of the project.

6.9.4 Monitoring

The amount of greenhouse gas emissions produced from the existing operation is calculated monthly based upon energy and fuel consumption. These data are used to track progress against emission targets on a monthly basis. The activities associated with the increase in throughput will be included in the emissions estimates and annual report to the Greenhouse Challenge Office.

7. Proponent's Environmental Management Commitments

Hamersley Iron is committed to meeting a level of environmental management performance consistent with national and international standards and statutory obligations. As such, the current works have been designed, are being constructed and will be operated in a manner that will minimise impacts on the surrounding biophysical and social environments.

As the proposal to increase the throughput to 145 Mtpa will be achieved through greater utilisation of infrastructure which already exists or is under construction, the operational commitments made in the 120 Mtpa EPS are relevant to the current proposal. No additional commitments are required to ensure that the proposed capacity increase will be operated in a manner that will minimise impacts on the surrounding biophysical and social environments (**Table 7-1).**

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- **Table 7-1 - Hamersley Iron's Commitments from Dampier Port Upgrade to 120 Mtpa Capacity relevant to 145 Mtpa Proposal**

Commitment No	Topic	Action	Objective	Timing	Advice
2	Dust	Hamersley Iron will continue to review and update the current Dust Management Plan to set long-term targets to achieve overall reduction in existing dust impacts	Reduce dust levels within the town of Dampier from the Dampier Port Operations through continuous improvement	On-going	DEC
		Hamersley Iron will implement the updated Dust Management Plan	As above	On-going	DEC
3	Dust	Hamersley Iron will modify the current dust monitoring program in order to take account of the port capacity increase and to better understand its contribution to dust levels within Dampier and King Bay	Improve existing dust monitoring programme	Pre-commissioning	DEC
		Hamersley Iron will review the dust monitoring data from the modified dust monitoring program against the predictions of the dust modelling assessment.	Confirm the modelling assessment and understand the implications of dust from the Dampier Operations on the town of Dampier and the King Bay Industrial Estate.	Post-commissioning	DEC
4	Noise	Hamersley Iron will continue to modify the Noise Management Program to identify key areas of the existing operation that require noise remediation works.	Work towards compliance with Noise Regulations.	On-going	DEC
		Hamersley Iron will implement the Noise Management Program	As above	On-going	DEC
5	Water Supply	Hamersley Iron will continue to review and update the water balance for the port operations, incorporating the port upgrade, to identify opportunities for reductions in water demand.	Better understand where water is used and minimise water use.	On-going	DEC

Commitment No	Topic	Action	Objective	Timing	Advice
6	Water Supply	As part of the port upgrade, Hamersley Iron will implement water recycling and water minimisation initiatives and progress a staff awareness program of water use minimisation.	Reduce the water supply demand from port operations.	Ongoing	DEC
7	Marine Environment	Hamersley Iron will continue to implement the long-term marine monitoring programme	To identify any impacts on the marine environment due to Hamersley Iron's operations	On-going	DEC
11	Community Consultation	Hamersley Iron will continue to actively support and discuss local environmental issues through the Coastal Community Environmental Forum	Maintain ongoing community consultation on local environmental issues	On-going	DEC

8. References

Aitkens, K.J 2001, *Declared Rare and Priority Flora List for Western Australia*, Prepared by the Department of Conservation and Land Management, August 2001.

Anstee, S.D. 1996, *Dampier Special Lease Area Fauna and Specially Protected Fauna Review*, Unpublished report, Hamersley Iron Pty Ltd, May 1996.

Astron 1996, *Dampier Special Lease Vegetation Survey Priority Species and Weeds*, Unpublished report prepared for Hamersley Iron Pty Ltd by Astron Environmental, July 1996.

Astron 2002, *Dampier Public Wharf Proposed Loading Facility and Laydown Area Environmental Protection Statement*, Prepared for Western Stevedores by Astron Environmental, February 2002.

Australian Bureau of Statistics 2001 (ABS), *2001 Census Data*, www.abs.gov.au, 01/05/03.

Beard, J.S. 1975, *Vegetation Survey of WA, 1:1 000 000 series, Pilbara sheet and explanatory notes*, University of WA Press, Perth.

Bureau of Meteorology 2003, *Averages for Dampier Salt*, http://www.bom.gov.au/climate/averages/tables/cw_005061.shtml, 01/05/03.

Cintron-Molero, G. 1992. "Restoring mangrove systems." Restoring the Nation's marine environment. G.W. Thayer, ed., Maryland Sea Grant Program, College Park, MD, 223-277.

CSIRO 2005, *Burrup Peninsula Air Pollution Study: Six-Monthly Report*. V1, May 2005

Department of Environment (DoE) 2004, *Pilbara Air Quality Study Summary Report*, Technical Series Report No 120, August 2004

Department of Environment and Conservation NSW (DEC NSW), 2005, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*, 26 August 2005

Department of Industry and Resources (DoIR), 2006. *DoIR Website: Burrup Rock Art Pages.* http://www.doir.wa.gov.au/investment/D78FA8400D554422991853F5A8B0263F.asp (Page modified 11/1/06. Accessed 19/10/2006).

Environmental Alliances (EA) 2003, *Dust Modelling for Hamersley Iron Dampier Port Expansion*. Prepared for Hamersley iron Pty Ltd by Environmental Alliances.

Environment Australia (EA), 2002. *National Ocean Disposal Guidelines for Dredged Material*. Commonwealth of Australia, Canberra, ACT.

Environmental Protection Authority (EPA) 2002, *Guidance for the Assessment of Environmental Factors: Guidance Statement for Minimising Greenhouse Gas Emissions*. Guidance Statement No. 12, October 2002.

Environmental Protection Authority (EPA) 2004a, *Position Statement No. 7, Principles of Environmental Protection* Environmental Protection Authority, 2004.

Environmental Protection Authority (EPA) 2004b, *Guide to EIA Environmental Principles, Factors and Objectives.* Version 2, November 2004.

Environmental Resources Management (ERM) 2006, *Dust Management Review. Pilbara Iron Port Operations*. Report for Pilbara Iron, July 2006.

Hamersley Iron 2002, *Dust Management Program Dampier Operations*, Version B, Prepared by Hamersley Iron Pty Ltd, August 2002.

Hamersley Iron 2004, *Dust Management Plan Dampier Operations*, Prepared by Hamersley Iron Pty Ltd, September 2004.

Joder, A. and Thoma, E. 2003, *Dampier Port Upgrade Vegetation Survey*, Hamersley Iron, July 2003.

MScience. 2005a. *Corals of the Dampier Harbour: Their survival and reproduction during the dredging programs of 2004*. Edited by J.A. Stoddart and S.E. Stoddart. Published on behalf of Dampier Port Authority and Pilbara Iron Pty Ltd 78 pp.

MScience, 2005b. *Cape Lambert Marine Monitoring Program*. Report for Pilbara Iron, August 2005.

National Environment Protection Council (NEPC), 1997, *Draft National Environment Protection Measure and Impact Statement for Ambient Air Quality*, 21 November 1997.

National Pollutant Inventory (NPI), 2001, *Emission Estimation Technique Manual for Mining* Version 2.3, December 2001.

Odum, W.E., C.C. McIvor, and T.J. Smith III. 1982. *The ecology of the mangroves of south Florida: A community profile.* U.S. Fish and wildlife Service, Offices of Biological Services, Washington, District of Columbia. FWS/OBS-81-24.

Paling, E.I., Humphries, G., McCardle, I. and Thomson, G., 2000, *The effects of iron ore dust on mangroves in Western Australia: Lack of evidence for stomatal damage*, Wetlands Ecology and Management 00: 1-8, 2000, Murdoch University, Perth.

Semeniuk, V; Chalmer, PN; Le Provost, I 1982, *The marine environments of the Dampier Archipelago*. J. R. SOC. WEST. AUST. Vol. 65, no. 3, pp. 97-114.

SKM 2003, *Dampier Port Upgrade to 95 Mtpa Capacity*, Environmental Protection Statement Prepared for Hamersley Iron Pty Limited by Sinclair Knight Merz.

SKM, 2005. *Dampier Port Increase in Throughput – 120 Mtpa*. Environmental Protection Statement Prepared for Hamersley Iron Pty Limited by Sinclair Knight Merz.

SKM, 2006a, *Dampier Port Increase in Throughput to 145 Mtpa: Greenhouse Gas Emission.* Unpublished report prepared for Hamersley Iron.

SKM, 2006b, *Dredging Program for the Dampier Port Upgrade:* Referral document to the EPA. Unpublished report prepared for Hamersley Iron.

SVT Engineering Consultants 2006. *Environmental Noise Model Review of the 95/120 Mtpa Dampier Port Upgrade*. Report to Pilbara Iron.

SVT Engineering Consultants 2007. *Update of the Environmental Noise Assessment of the Proposed Dampier Port Upgrade Phase B (145 Mtpa Throughput)*. Report to Pilbara Iron.

Trugden, M.E. 2002, *A flora, vegetation and floristic survey of the Burrup Peninsula, some adjoining areas and part of the Dampier Archipelago, with comparisons to the floristics of areas on the adjoining mainland*, Prepared for the Department of Mineral and Petroleum Resources by M.E Trugden and Associates, Volume 1, February 2002.

Wanati, 2003. Potential of Iron Ore Dust Impacts on Aboriginal Rock Engravings in the Burrup region of Western Australia. Prepared by John Clarke for Pilbara Iron.

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9. Abbreviations

AQIS	Australian Quarantine Inspection Service
ARI	Assessment of Referred Information
CALM	Department of Conservation and Land Management
CCEF	Coastal Community Environmental Forum
CD	Car Dumper
CEO	Chief Executive Officer
CO_2-e	Carbon Dioxide Equivalent
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEC	Department of Environment and Conservation
DEH	Commonwealth Department of Environment and Heritage
DMP	Dust Management Plan
DoE	Department of Environment
DOH	Department of Health
DoIR	Department of Industry and Resources
DPS	Dampier Primary School
DPU	Dampier Port Upgrade
DRF	Declared Rare Flora
EII	East Intercourse Island
EPA	Environmental Protection Authority
EPASU	Environmental Protection Authority Service Unit
EPP	Environmental Protection Policy
EPS	Environmental Protection Statement
ERM	Environmental Resource Management Pty Ltd
FD	Fixed Drive
HIP	Hamersley Iron Premium Product
HIX	Hamersley Iron Mix
IEMS	Iron Environmental Management System
ISO	International Standard Organisation
KEPP	Kwinana Environmental Protection Policy
LNG	Liquefied Natural Gas
NEPC	National Environmental Protection Council

NEPM	National Environmental Protection Measure
PM	Particulate Matter
PDC	Pilbara Development Commission
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter less then 2.5µm
PM_{10}	Particulate Matter with an aerodynamic diameter less then 10µm
PM_{50}	Particulate Matter with an aerodynamic diameter less then 50µm
PP	Parker Point
Q	Quarter
SH	Screen House
SKM	Sinclair Knight Merz
SL	Ship Loader
SOR	Shire of Roebourne
TEOM	Tapered Element Oscillating Microbalance
TSP	Total Suspended Particulates
VET	Vocational Education and Training

UNITS

%	Percent
°C	degrees Celsius
cm	centimetres
dB	decibels
dB(A)	A weighted decibels
DWT	dead weight tonnes
GL	gigalitres
GLpa	gigalitres per annum
g/s	grams per second
ha	hectares
kg	kilograms
kL	kilolitres
kL/day	kilolitres per day
km	kilometres
km/hr	kilometres per hour
LAeq	A-weighted Leq

LASmax	maximum A-weighted sound level (slow)
$L_{A\ Max}$	assigned noise level which is not to be exceeded at any time
$L_{A\ 1}$	assigned noise level which is not to be exceeded for more than 1% of the time
$L_{A\ 10}$	assigned noise level which is not to be exceeded for more than 10% of the time
L/t	litres per tonne
m	metre
mg/m^3	milligrams per cubic metre
mm	millimetre
µ	micron
$\mu g/m^3$	micrograms per cubic metre
µm	micrometre
m/s	metres per second
m^3	cubic metres
ML	megalitres
ML pa	megalitres per annum
Mt	megatonnes
Mtpa	megatonnes per annum
MW	megawatt
t	tonne
tpa	tonnes per annum

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Appendix A Dust and Noise Community Survey

A.1 Dust and Noise Community Survey

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A.2 Raw data is available from Pilbara Iron - please contact Peter Royce on 9327 2351 to obtain a copy

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Appendix B Supporting Dust Documents

B.1 Estimation of Dust Emissions for PI Dampier Operations at 95 Mtpa and 145 Mtpa (Phase B)

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B.2 Dust Impact Assessment for Proposed Pilbara Iron Dampier Port Expansion to 145 Mtpa (Phase B) – Dispersion Model Set-Up and Assessment of Performance

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B.3 Dust Dispersion Modelling for Pilbara Iron Dampier Port Expansion to 145 Mtpa (Phase B)

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B.4 Hamersley Iron Dust Management Plan – Dampier Port Operations.

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Appendix C Environmental Noise Reports

C.1 Environmental Noise Assessment

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C.2 Environmental Noise Management Plan

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Appendix D Greenhouse Gas Assessment Report

D.1 Greenhouse Gas Assessment

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D.2 Greenhouse Gas Management Plan

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